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THE
LARYNGOSCOPE
IN
DISEASES OF THE THROAT;
WITH A
CHAPTER ON RHINOSCOPY.
A MANUAL FOR THE STUDENT AND PRACTITIONER.

BY
SIR GEORGE DUNCAN GIBB, BART., M.D., LL.D.,
ASSISTANT-PHYSICIAN AND LECTURER ON FORENSIC MEDICINE,
WESTMINSTER HOSPITAL.



· THIRD EDITION.

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TO MY FRIEND,
GEORGE EDGEWORTH FENWICK, M.D.,
OF MONTREAL, CANADA,

THIS WORK IS INSCRIBED, WITH
FEELINGS OF
THE WARMEST ATTACHMENT AND ESTEEM.



PREFACE TO THE THIRD EDITION.

THE time has been so short since the publication of the second edition—a little over a year—that it has afforded scarcely any opportunity for the introduction of additional matter into the present edition, bearing upon the subject of which the volume professes to treat; it will be found, nevertheless, in no way behind its predecessor. With renewed expressions of gratitude for past favours, the author hopes to be fortunate enough in continuing to merit the confidence of his professional brethren.

1, BRYANSTON STREET,

PORTMAN SQUARE;

1st August, 1868.



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LARYNGOSCOPY.

CHAPTER I.

HISTORY OF THE LARYNGOSCOPE.

LIKE every other invention, that of the Laryngoscope—supposed to be one newly made and quite recent—is now found to have occurred upwards of half a century back. Czermak attributed the invention to Liston; shortly afterwards, the claims of Babington were put forward; Bozzini superseded him; and, in his turn, Bozzini may have to yield to others. The claims of science as well as of justice require that credit and honour be given to any one who originates means or appliances for the discovery of hidden disease, and such as shall render it more amenable to treatment. Reflecting upon the simplicity of the principles of laryngoscopy, and the facility with which the recesses of the throat can be examined, the wonder is that such useful aids to diagnosis had not been familiar for centuries, or at any rate since the days of Newton. Our surprise, nevertheless, need not

be excited when we remember that it is only in our day that exact science is doing so much for special classes of disease. Laennec, who devoted himself to the study of the various diseases of the chest, invented the stethoscope, now in universal use. The ophthalmoscope—more recent in its history than the laryngoscope—in the hands of those devoting themselves to the study of the eye and its maladies, has effected a revolution in our knowledge of all that pertains to that part of the organism, and its use is now accepted and taught in all schools of medicine. Older in its history, though more recent in its general adoption, the laryngoscope promises to be behind no other modern appliance, for thoroughly exposing to actual inspection—through reflection—diseases involving organs not inferior in importance to the lungs, the heart, or the eye. It becomes necessary, therefore, that the claims of those who have in any way laboured to throw light upon the hidden recesses of the larynx, the throat, or the nose, should be briefly passed in review.

Under the name of *glossotochus*, an instrument has been described by Paul of Egina for inspecting the mouth and pharynx, in reality, constituting a pharyngoscope of the present day. It consisted of a concave blade to keep the tongue depressed, and

of a limb shaped like a horseshoe that fitted beneath the chin.

Fabricius Hildanus includes in his list of instruments required for the military chest* a simple and a complex speculum oris: the latter is mentioned as "*speculum oris integrum*, quo in magnis faucium et linguæ inflammationibus, veluti in angina, lingua deprimitur."

In all probability, this is the same speculum oris described and figured by Scultetus in his 'Armentarium Chirurgicum' (1655), and possibly the one mentioned by Paul of Egina.†

It is spoken of as "*a strong speculum oris* with which not only the tongue is depressed, but also the lower jaw, thus affording a correct view of the diseases or vices which destroy the throat; likewise allowing, during its introduction, of the use of such instruments and medicaments as may be necessary. It affords the power, in the first place, of preserving and keeping the teeth open in obstinate and cataleptic persons, who are astonished to find that they swallow the food which has been introduced into the mouth."

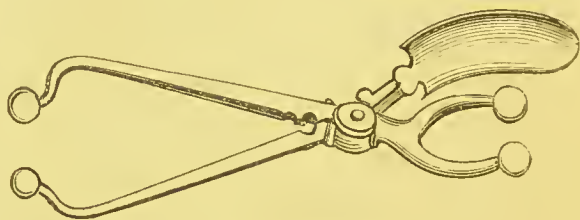
As representing a very ancient pharyngoscope, a

* 'Opera, Francofurti ad Mœnum,' folio, 1646, p. 1042.

† It is also figured in the works of Ambrose Paré, folio ed., Lyons, 1641, p. 190.

copy of the woodcut is introduced; and its configuration will show it possessed immense power of leverage in depressing both the tongue and lower jaw. If warmed, the convex polished surface of the steel plate introduced into the mouth would reflect the light into the back of the throat, and might receive the impression of the image.

FIG. 1.



The Glossotochus.

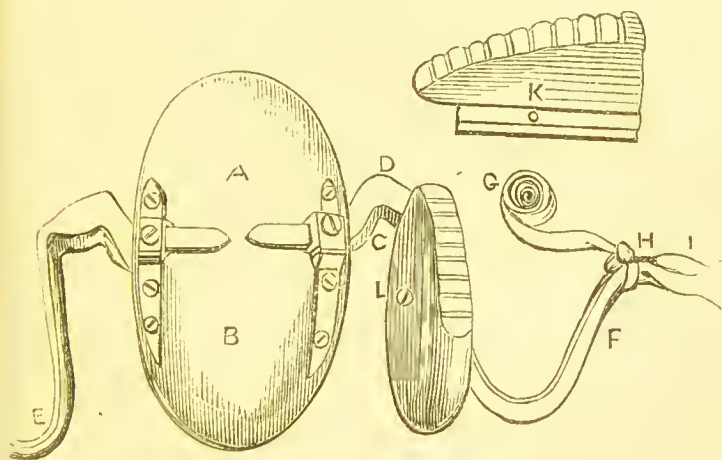
Levret, an accoucheur of some note in his day, and a high authority on the treatment of polypi of the womb, nose, and throat, was acquainted with this instrument, and doubtless grasped the idea of its utility in illuminating the recesses of the throat in polypi of the posterior nares hanging downwards. He was assuredly the first person who took some pains to illuminate the cavity of the mouth and throat. In the Preface to the first edition of his work, published in 1749,* he says—"Je propose,

* 'Observations sur la Cure radicale de plusieurs Polypes de la Matrice, de la Gorge, et du Nez.' 8vo, Paris.

pour la facilité de cette opération, un nouveau *speculum oris*, ou miroir de la bouche, que je erois infiniment plus eommode et plus sûr que tous eeux qui sont déerits par les auteurs : je fais la description de ee *speculum*, et j'en démontre tous les avantages qui le rendent supérieur aux autres."

In operating upon the deep parts of the throat, he considered it important to overeome the mobility of the lower jaw and the tongue ; and of the various examples of a *speculum oris*, or "mirror for the mouth," which had been deseribed up to his time (1743), all appeared to be ineonvenient in praetice, and eaused pain : besides, he doubted their power to restrain the tongue as was wished, and therefore contrived one of his own, which is represented in Fig. 2.

FIG. 2.



Levret's Pharyngoscope.

This instrument at once rendered the tongue immovable; it held the mouth open without the possibility of closure, and by means of a polished plate of steel which formed its body, it reflected *catoptrically* the rays of light upon the spot occupied by the polypus. It could be very readily applied, and to retain it in its place it was only requisite to tie the strings at the back of the neck, which were fastened to its two extremities.

It was composed of seven distinct pieces, of which one was single, and the six others formed three pairs. The single piece consisted of a plate of steel, highly polished, a little convex on its upper and concave on its under surface, so that the tongue could be received and held the more easily. A was placed behind, and B in front.

The two first pieces, forming the first pair, formed an angular or flat arch, beneath which slid the bolt, forming the end of the arm. These were likewise of steel, and attached to the lateral parts of the plate of metal by means of three screws, one of them situated posteriorly, and the two others anteriorly.

Beneath each of these flat arches passed one of the extremities of the two pieces which formed the second pair. These were retained in their situation simply by the pressure of the two screws, of which the heads are seen in the centre of the arches. The

continuity of these pieces was bent twice at a right angle, first, between the part that is beneath the arch up to c, and, second, between c and d; thus forming a handle, of which the line c was perpendicular to the plate of metal, and the line d horizontal with it, in such a manner that the continuity of these twin pieces formed arms or branches of the instrument. The part comprised between c d, d c, fitted into the angle of the jaw beyond the last molar teeth; the elbows e and f encircled the commissures of the lips, and the extremities f and h were applied upon the cheeks without inconvenience; and, finally, the instrument was fastened at the back of the neck with the strings i g, attached at h.

The third pair was compressed (or held) between the whole of the molar teeth, as in that piece which is between d and f, and which is the same as k, viewed sideways.

In k is seen the groove to receive the slender part of the arm, held in position by means of a screw, as at l. The upper surfaces of this pair were irregular, to receive the prominences of the molar teeth when firmly applied against them.

When it was desired to introduce this instrument into the mouth, the bent portion of the arm marked e f was seized with the thumb and index finger of each hand, and firmly pressed against the horizontal

portion of the lower jaw. The distance between these two arms could be regulated to suit the width of the mouth by means of the screw over the angular arch; and it was found convenient to have the pieces of wood of different heights, to suit different mouths.

Such is the description of the *speculum oris* or pharyngoscope of Levret, which, he says, allows a view of the parts at the back of the mouth and throat. His invention was an improvement upon all those that preceded his time; and whilst it afforded great facility in operating upon the recesses of the mouth and throat, and especially in reflecting ordinary light upon the diseases of those parts, yet it cannot be considered as possessing any claim to the merits of a laryngoscope. The polished plate of steel fastened upon the surface of the tongue was not warmed so far as we know, yet its temperature may have risen above that of the respired air, by the heat of the tongue, and so permitted of not only the reflection of light, but also that of the image, upon its surface. Therefore, whilst willing to accord credit to Levret for making a decided step in advance in his mode of illuminating the throat, we cannot declare him to be the *inventor* of the laryngoscope, nor the originator of the use of artificial light. Those who are not perfectly familiar with all that pertains

to the art of laryngoseopy might be disposed to consider his apparatus as a laryngoscope ; but it is abundantly evident that the instrument here figured and described, as used upon the surface of the tongue, where only it could be applied, was never employed to see the larynx. It would assuredly in some instances expose to view, or rather illuminate, the lingual surface of the epiglottis, already capable of being seen with the unaided eye. A true laryngeal mirror, on the other hand, held at the back of the mouth, as now employed, would expose the reflection of the parts within the larynx and the laryngeal surface of the epiglottis, which Levret's instrument could not do.

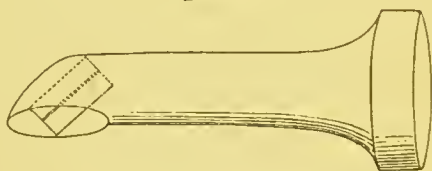
In 1807 a work was published at Weimar, by Dr. Philip Bozzini, upon a light conductor, or apparatus for illuminating the internal cavities and spaces of the living animal body, which, it appears, produced as much excitement at that time as the laryngoscope did on Czermak's resuscitation of it some few years back.

For a few years before, his reputation had spread to various countries, and extraordinary reports circulated as to the marvels of his invention. Yet he did not escape the ill-will of those who, either through jealousy of his success, or doubting the accuracy of his observations, did not hesitate to

use the means at their disposal to underrate and deery his honest exertions to advance medicine. His instrument combined all the principles of the laryngoscope applied by means of illumination and reflection; and although it was imperfect, he is entitled to some merit, as undoubtedly the first who practised the art, albeit imperfectly.

His speculum, represented in Fig. 3, after Hufeland, consisted of a polished metal tube of silver or tin for the various canals of the body, a certain size being reserved for the throat. This tube was divided by a vertical septum or partition; and at its curved extremity were two small mirrors, directed upwards or downwards according to the situation of the part to be examined. When introduced, the light was

FIG. 3.



Bozzini's Laryngeal Speculum.

reflected into the mouth by means of a tin lantern, in the form of a vase-shaped box, in the opposite sides of which were circular openings—a larger and a smaller—to the larger one of which was fastened the speculum, and the smaller an eye-picce. In the

centre of the lamp was a receptacle for a candle, which, when lit, allowed the flame just to reach the level of the two openings in the lamp, parallel to one another and in a line with the tube. On applying the eye to the eye-piece, the reflected image was seen in one of the mirrors at the end of the speculum, and the other mirror conveyed the light, both passing through the different channels divided by the vertical septum.

This apparatus may be described as somewhat complicated and not easy of application, as may readily be understood. Very few would be disposed to employ it; and after a short-lived reputation it fell into oblivion, until its history was recently dug up, and Frankfort-upon-the-Maine became celebrated as the cradle of the art, at any rate.

We next find that pretty nearly about the same time, in 1827 and 1829, two perfectly independent observers were at work, and notices of their invention appeared in the latter year. Their names were Senn and Babington. Senn was a physician of Geneva, who made but a single effort to see the upper part of the larynx of a little girl, by means of a small mirror which he had constructed for introduction at the back of the pharynx. He made no further use of the mirror; but in some remarks upon the subject published in the '*Journal des Progrès*' for 1829, he

observed that he abandoned the use of it on the little girl, the subject of dyspnœa and dysphagia, on account of its small size, and ventured upon the opinion that this mode of examination might be useful in the diagnosis of laryngeal phthisis in adult persons.

As he did not use artificial light, and as it was a first attempt, and that upon a child, no wonder he failed. How many more perhaps are there who may have done as much as Dr. Senn, who have left no record behind them of their attempts to see the larynx ! He seems to have caught at the right idea of a laryngoscope, minus the essential aid of illumination; yet if we place him in the scales with Babington, he will be found wanting.

We now come to consider the claims of one of whom it may be said, without partiality, and in all fairness, that he was the *inventor of the laryngoscope*; and fortunately it has been recorded in such a manner as to leave no possibility of doubt on the matter. On the 18th of March, 1829, Dr. Benjamin Guy Babington exhibited before the Hunterian Society an instrument, which he called the *glottiscope*, in many respects similar to the laryngoscope which is now generally employed. Let the reader contrast the substance of the following extract with a description of some of the processes for the employment

of the instrument in my translation of Czermak's work on the subject for the New Sydenham Society, and he will be prepared to give to Dr. Babington the praise of being in every sense the inventor :

“Dr. Benjamin Babington submitted to the meeting an ingenious instrument for the examination of parts within the fauces not admitting of inspection by the unaided sight. It consisted of an oblong piece of looking-glass set in silver wire, with a long shank. The reflecting portion is placed against the palate, whilst the tongue is held down by a spatula, when the epiglottis and upper part of the larynx become visible in the glass. A strong light is required, and the instrument should be dipped in water so as to have a film of the fluid upon it when used, or the halitus of the breath renders it cloudy. The doctor proposed to call it the glottiscope.” *

Here we have the principle of illumination and reflection ; for Dr. Babington employed two mirrors, one small, set in wire (as above described), and resting against the soft palate—the other larger, a toilet-glass to receive the solar rays, and concentrate them upon the smaller mirror, or true laryngoscope, at the back of the mouth. The examination of the patient was conducted in much the same manner

* ‘London ‘Medical Gazette’ for 28th March, 1829 (vol. iii, p. 555).

as is practised at the present day when sunlight is employed : he was placed in a chair with his back to the sun ; in the left hand was held the illuminating mirror (corresponding to the frontal mirror now in use), whilst the small or laryngeal mirror was introduced into the mouth with the right hand. Instead, however, of the tongue being held out of the mouth, it was compressed by means of a depressor ingeniously attached to the laryngeal mirror, as shown in the accompanying woodcut,* Fig. 4, p. 16. It will be observed that a spring exists between the shanks of the two instruments, which caused depression of the tongue on pressing the handles together. This contrivance proves that Dr. Babington fully recognised the importance of mastering the tongue ; but it is very doubtful whether the union of the two instruments did not prove more of an inconvenience than an advantage, for reasons given in another part of this work (Chap. 11).

From Dr. Mackenzie's paper before the Medico-Chirurgical Society, we learn that Dr. Babington abandoned the combination of mirror and spatula between the years 1829 and 1835, and had polished steel mirrors made like those now in use. He never employed artificial light, nor did he record any cases

* This is reduced in size from the plate in Dr. Mackenzie's paper.

in which the instrument was employed. When this invention of our countryman was brought before the Society already named, in some remarks then made* I took the opportunity of supporting the views of the author concerning the credit due to Dr. Babington as the inventor of the laryngoscope; and an investigation of the claims of Dr. Senn only confirms his attempted employment of a *laryngeal mirror*, whilst Babington invented a *laryngoscope*. For the present, at any rate, the question is set at rest, and Babington's laurels rest undisturbed.

Trousseau and Belloc mention, in their Memoir on Phthisis Laryngea, published in 1837,† that Selligie, an ingenious mechanic affected with this malady, had been cured by Dr. Bennati, of Paris, by means of a speculum made by the patient. It consisted of two tubes attached together, one of which served to throw the light upon the glottis, whilst the other reflected the image of the glottis upon a mirror placed at the guttural end of the instrument. This occurred in the year 1832. Trousseau, whilst disbelieving the statements of Bennati, had a similar instrument constructed, but seldom or never employed it.

* 'Medical Times,' May 7th, 1864, and 'Lancet,' May 14th, 1864.

† 'Mémoire de l'Académie de Médecine,' tome vi, 1837.

Dr. Babington's Laryngeal Mirrors.

A. The instrument exhibited at the Hunterian Society in 1829, and again shown with Dr. Babington's other mirrors by Dr. Mackenzie at the Medical and Chirurgical Society in April, 1864.

B. The laryngeal mirror. The steel stem of the mirror widens at one extremity into a frame, which contains the glass.

C. The tongue-depressor.

D. A ring which connects the two instruments.

E. A spring which presses the tongue-depressor down when the two handles are held together.

F. Front view of the mirror made in 1829.

G. Side view of steel mirror made between the years 1829 and 1835.

H. Front view of the same mirror.

I. Oval mirror made between 1829 and 1835.

Beaumês of Lyons, in 1838, exhibited a speculum for examining the throat, larynx, and back of the nostrils, before the medical society of that city. It consisted of a mirror the size of a two-frane piece, attached to a stem of wood or whalebone, and could be used with ease.*

Liston was in the habit of examining ulcerations about the larynx in phthisis laryngea, inflammatory œdema of the epiglottis met with in that affection giving rise to dysphagia, and supraglottic œdema of the larynx (the old œdema of the glottis), with a glass speculum as used by dentists for many years prior to 1840. He had frequently seen the true glottis and ulcerations in the interior of the larynx, but to his master-mind this was simply an aid to diagnosis. The following are his observations on the subject :—"The existenee of this swelling may often be ascertained by a careful examination with the fingers, and a view of the parts may sometimes be obtained by means of a speculum—such a glass as is used by dentists on a long stalk, previously dipped in hot water, introduced with its reflecting surface downwards, and carried well into the fauces."†

* 'Compte Rendu des Traveaux de la Société de Médecine de Lyons,' 1836-38, p. 62.

† 'Practical Surgery,' third edition, p. 417, 1840.

The swelling here referred to is supraglottic œdema.

In 1844 Dr. Warden, of Edinburgh, invented a prismatic speculum, with which, it appears, he succeeded in seeing the disease in two cases of "affected glottis." He stated that "the epiglottis was immediately seen, but it was only when efforts to swallow were made that the arytenoid cartilages and glottis were raised out of concealment, and brought brilliantly to show their picture in the reflecting face of the prism." Now, it is a singular fact that in some persons whose fauces are extremely irritable, especially in persons with phthisis laryngea in an advanced stage, the moment the laryngeal mirror is pressed against the centre of the velum a disposition to retch occurs, the larynx is lifted upwards, and an instantaneous view is obtained of the true glottis before the epiglottis falls backward prior to the removal of the mirror out of the mouth. We are prepared, therefore, to admit that Dr. Warden did actually see the vocal cords in one, if not both, of his cases, and that he did not confound the upper aperture of the larynx with the true glottis as we now understand it. Ingenious and scientific, however, as was his mode of examination by means of prisms of flint glass, it was not calculated to answer the purposes of a laryngoscope, as Mackenzie has very clearly shown by his

experiments with them.* Dr. Warden used two glass prisms; one was introduced to the back of the mouth, the other was attached to a powerful Argand lamp, to throw the full light of the lamp into the fauces and pharynx. Too much space was occupied by the prism in the mouth, and gave rise to obstacles fatal to facile laryngoscopy.†

In the year 1848 Mr. Avery showed me some cases of cleft palate at the Charing Cross Hospital, and at that time used instruments for looking at the throat and larynx, the posterior nares, interior of the bladder, and other cavities, with which he had been experimenting for some years. He used a laryngeal mirror attached to a stem, and employed artificial light with the flame of a candle in front of a concave, polished metal reflector, attached to the head by means of a frontal pad holding a double spring passing backwards to a counter pad beneath the external occipital protuberance. The reflector was perforated, so that when placed before the eye it allowed of vision through the opening. When the light was thrown into the throat, and the proper focal distance regulated, the mirror was introduced with the right hand, and the larynx was examined. Here were all

* See 'London Med. Gazette,' vol xxxiv, p. 256, and 'Monthly Journal of Med. Science,' July, 1845.

† 'The Laryngoscope,' 1st ed., p. 36.

the elements of laryngoscopy as now employed. Artificial light was used, although none of the best; the throat was illuminated by means of a fixed reflector perforated in the centre, and a laryngeal mirror was employed pretty much the same as now used. In his first attempts the laryngeal mirror was placed at the end of a large tube or speculum, on the principle of his other instruments for examining the urethra and bladder—the modern endoscope. This mode he abandoned for seeing the back of the nose and larynx, and used a mirror such as is figured in Dr. Yearsley's book.*

Unfortunately, Avery never published any description of his laryngoscope; but as it was well known to a number of persons, amongst others to his relative Dr. Yearsley, who has ably advocated his claims on the matter, and as it was supplied to one of the large London hospitals by Weiss, his merits in the question both of priority and history are not likely to be overlooked. Although the year 1840 has been stated elsewhere as the period at which he commenced his experiments, it seems to me that he

* See 'Medical Circular' for June 25th, 1862, p. 454, and 'Introduction to the Art of Laryngoscopy,' by Dr. Yearsley, London, 1862. Avery's laryngoscope, as made for the London Hospital in 1846, is figured in Mackenzie's work on the laryngoscope.

was at work before that time, and has priority over Dr. Warden.

Was it to Avery that Dr. Turek was indebted for his idea of the instrument? as Dr. Yearsley has asked. Was it at Yearsley's house, or Avery's, or at Weiss's, that Turek first saw the throat speculum—now the laryngoscope—when he was in London in 1850? To these questions Dr. Turek himself only can reply.

Some twenty years later, in 1854, Professor Manuel Garcia conceived the idea of examining the mechanism of the human voice in singing, a thing which had occupied his thoughts for some time. This he carried out in his own person at Paris in September of that year, and his very interesting researches on the subject were brought before the Royal Society of London in 1855. He employed a small mirror attached to a stem for introduction at the back of the throat, and a larger one for his hand to transmit the rays of the sun on to the little mirror which reflected the image of the larynx into the larger mirror. The back was turned towards the sun, as I have myself seen him practise. With him the process was one of great simplicity and ease.

Garcia was not only the *first* person who performed auto-laryngoscopy—to see one's own larynx—but also the first to employ a laryngeal mirror in an

extensive manner physiologically, and the first to perform a series of experiments on a large scale in relation to singing—the determination of the falsetto and chest registers of the voice—as might be expected from one who was a master of his art and the brother of the celebrated Madame Malibran.* His observations from the first were never disputed.

When Czermak published his first essay in 1858 the title of it was ‘Physiological Researches with the Laryngeal Mirror of Garcia,’ showing the importance he attached to the experiments and researches of the latter, in thus giving his name to the mirror. These experiments are among the most important that have ever been, or are likely to be, made, and reflect the highest credit upon the sagacity and genius of their originator; they are so beautiful and so interesting physiologically in relation to the voice, and help us so much to appreciate the pathology of vocalism, that we cannot be too grateful for them, as they appear in the ‘Proceedings of the Royal Society,’ under the title of “Observations on the Human Voice.”† In a lecture delivered 11th of March, 1863, before one of the most critical bodies in the kingdom—the Musical Society of London—‘On the Influence of Musical

* He is Professor of Singing in the Royal Academy of Music.

† Vol. vii, p. 399. Read May 24th, 1855.

and other Sounds upon the Larynx, as seen by the aid of the Laryngoscope,' illustrated by a large number of coloured diagrams—I took the opportunity of acknowledging how much we owed to Garcia, and stated that his researches, which had given the first impulse to the study of laryngoscopy, had formed the basis of experiment for all subsequent observers.

Garcia's researches appeared in a prominent place, and this, together with their importance, was the means of spreading the fame of the laryngoscope. Dr. Turck, chief physician to the General Hospital at Vienna, became acquainted with them, and commenced using the laryngeal mirror for the diagnosis of diseases of the larynx in hospital practice in the summer of 1857. He used sunlight, without a second mirror, for illuminating the throat; the consequence was that he did not find the instrument to realise his expectations. He it was, however, who revived its use for medical purposes, and doubtless in time—whether he had lent his mirrors to Czermak or not—would have overcome all the obstacles which then existed. Dr. Turck, therefore, is entitled to some consideration in the question of the revival of laryngoscopy; and this has not been overlooked by the French Academy of Medicine, who divided the merit of the resuscitation of the laryngoscope and

its introduction into general practice between Turck and Czermak, and a prize offered by the Academy was shared between them.*

Later in the same year 1857 Turck lent his mirrors to Czermak, who lost no time in making himself thoroughly master of their use, and published various papers showing their value in 1858 and 1859.† He adapted the ophthalmoscopic mirror of Ruete for the purpose of reflecting artificial light; he employed mirrors of various sizes, and perfected them in every possible way. He travelled in various countries to disseminate his views and to endeavour to obtain for them a universal recognition. His name necessarily became associated with the art; so much so, indeed, that as one of his earliest disciples and pupils, in my own writings I hailed him the *Father of Laryngoscopy* on December 15th, 1862,‡ and this term has been sanctioned by others as most just. My respected friend and teacher, Professor Czermak, is therefore too just a man to find fault with an impartial consideration of the rival claims of Dr. Turck and himself; and in the observations

* It would be only fair hereafter to call it the Turcko-Czermak revival of laryngoscopy.

† See the author's translation of Czermak's 'Essay on the Laryngoscope,' published by the New Sydenham Society, article "Bibliography."

‡ The 'Lancet,' January 17th, 1863, p. 65.

which have been made respecting both, I have availed myself only of the province of the historian of an important aid in alleviating the distresses of mankind.

It was in the summer of the year 1860 that Czermak first visited London, and in common with others I became one of his disciples; through his exertions the fame of the laryngoscope has spread everywhere, and it is now recognised as an indispensable requisite in the hands of every member of our profession, as much so, indeed, as is the stethoscope.*

* A year before Czermak's first visit to London I employed a steel mirror for inspecting the laryngeal surface of the epiglottis, the deep fossæ on either side of the root of the tongue, and other parts. It is figured in the *first* edition of my work on 'Diseases of the Throat,' p. 34, published by Mr. Churchill in January, 1860. The mirror was attached to a slender rod, and was movable through a ball-and-socket joint. The direct rays of artificial and sunlight were used as occasion served, and the mirror was warmed in hot water before introduction.

CHAPTER II.

DESCRIPTION OF THE LARYNGOSCOPE.

The Laryngeal Mirror.

THE laryngoscope is now understood to consist of a small mirror to be introduced into the fauces, a larger reflecting mirror to wear before the eye or forehead, and a lamp to furnish artificial light.

The laryngeal mirror is a circular disc of glass, coated with amalgam upon its posterior surface, and set in metal; it is attached to a flexible metallic stem, fitted into a hollow handle of wood, ebony, or ivory. The handle may be detached, to suit mirrors of various sizes, the stem being held in its position by a button and screw.

Mirrors are also made of steel, but have fallen into disuse, from the readiness with which they tarnish, and the great difficulty in keeping them clean; nevertheless, the brilliancy of their reflecting surface is considerable.

I have had them made of silver and of silver gilt,

with highly burnished surfaces, and they possess an advantage sometimes over both glass and steel when a brilliant surface is required, with a continuous amount of heat.

The shape of the laryngeal mirror varies from an oblong, oval, elliptical, square with the angles rounded off, to circular. Preference is now given to the last as the most convenient for all purposes. Their thickness, on the average, is the sixteenth of an inch, and in size they vary from three or four lines to an inch and a half in diameter. For purposes of demonstration and subglottic examination they are made larger and smaller than those dimensions. The most convenient size for common use is a mirror with the diameter of an inch.

The mirror is attached to the metallic stem at an angle of sixty degrees; the stem is usually four and a half inches long, and can be lengthened or shortened in the hollow handle by means of the button and screw; the handle should not exceed three inches in length, and be made light and slender.

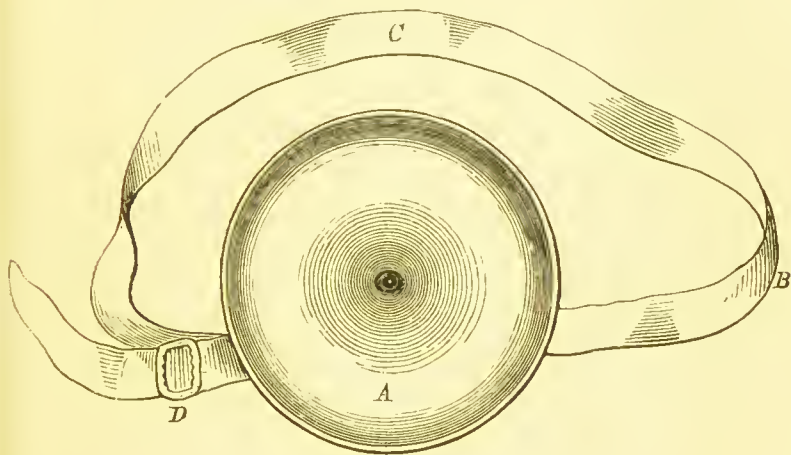
The Reflector.

The reflector is a circular mirror about three and a quarter inches in diameter, for the purpose of

throwing the light into the throat before employing the laryngeal mirror.

It should possess a very slight concavity, and a focal distance of fifteen inches. It may be worn

FIG. 5.



The Reflector.

either before the right eye, attached to a large spectacle frame, as adopted by Semeleder, the handles of which go well round towards the back of the head, and are much larger than the spectacles in common use,* or on the forehead, by means of an elastic band (see woodcut), or between the two eyes or before the nose and mouth. Preference is mostly given to the position upon the forehead (as advocated by Moura-Bourouil-

* A *small* spectacle frame cannot support the weight of the mirror, and is constantly shifting its position and tilting forwards.

lon, Johnson, and others), fixed by means of a ball-and-socket joint (as Mason advised) and elastic band with a buckle. The spectacle frame has its advantages, and is the form in which Maekenzie and the author employ it, in which case the mirror is perforated in the centre (not necessary for the frontal mirror). The hole should be oval or eye-shaped, running from right to left, seven sixteenths of an inch in its longest diameter, and the glass should be unsilvered.*

In the use of the perforated reflector before the eye the aperture should be in front of the pupil, so that both eyes may be employed in vision—a matter of easy accomplishment with a little practice. This accuracy of position, however, is not always essential, for a good view is obtainable with the left eye, aided by the co-operation of the right eye. Both eyes should always be kept open in using a perforated reflector.

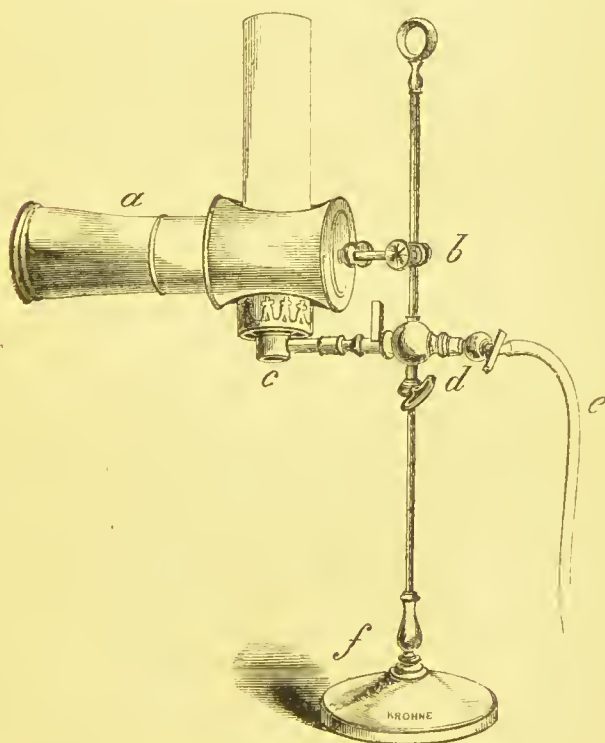
The attachment of the reflector to the large spectacle frame, the forehead band, or the mouth-piece of Czermak, as made by Weiss, permits of movement in any possible direction, which is stated on the author's personal experience in the use of each.

* I have had constructed by Weiss a pocket reflecting mirror, with a mouthpiece and wire stem like Czermak's, connected to it by a ball-and-socket joint, in which the diameter of the former does not exceed two inches, and an oval perforation exists half an inch long.

Illumination.

A great deal can be said on the subject of illumination, but for all ordinary purposes a good moderator lamp will answer, such as is on every one's table, and with which, indeed, all the experiments of

FIG. 6.



Tobold's Light Condenser.

Czermak, Turek, and others, were made. Failing it,

an Argand gas-burner, with a glass chimney, will prove convenient; this, again, is in the consulting-room of most medical men. If an Argand lamp is suitably made, a Tobold's condenser can be added, as supplied to me and others by Krohne, White-chapel Road, which possesses one or more lenses placed in front of the flame. It is shown in fig. 6. *a* represents the light condenser or concentrator, fastened to the stand, *f*, at *b*, which permits of the regulation of its height; the Argand gas lamp, *c*, and the tube conducting the gas, *e*, are attached to the stand at *d*. I have found it convenient to add behind the flame a white enamel reflector, which is always clean and free from scratches and spots. This gives all the brilliancy of a light-concentrator, and affords a fine, clear, white light, of great illuminating power.

A small paraffine lamp answers very well on visiting patients, where no other lamp is convenient, and, with a little dexterity on the part of the operator, even an ordinary fish-tail burner may be made subservient in affording illuminating power. A lamp, however, is always to be preferred. I recommend an Argand burner and glass chimney, upon a small stand, with an india-rubber tube attached, as a portable lamp, to visit patients. It has the advantage of being always clean.

There are various lamps that go by the names of the different inventors—such as Voltolini's, Bouthillier's, Tobold's, Battaille's, Peltier's, Bonacina's, Mackenzie's, and my own. They are all useful, some of them rather complicated. Mackenzie's light-concentrator is handy and convenient.*

The light to be employed for illuminating the throat may be either natural or artificial. The former is not always readily available, and hence the resort to artificial, as has been described. The natural light consists of day- and sunlight. If daylight be used, its feebleness is too great for satisfactory examination, although the parts can be made out.†

In employing sunlight, the patient sits with his back to the window, and the rays are received in the reflector before the head of the examiner, and are thence conveyed to the laryngeal mirror. Slight heat is generally produced, and a little precaution is necessary to avoid burning the larynx by concentrating the rays to a focus. The light afforded by the sun is the most powerful of any employed, and

* It may be obtained of Mayer, 51, Great Portland Street. Weiss, in the Strand, has portable gas-lamps which slide up and down on a stand; so has Krohne, Whitechapel Road.

† Clear, full moonlight I have found on some experimental occasions better than daylight for illumination.

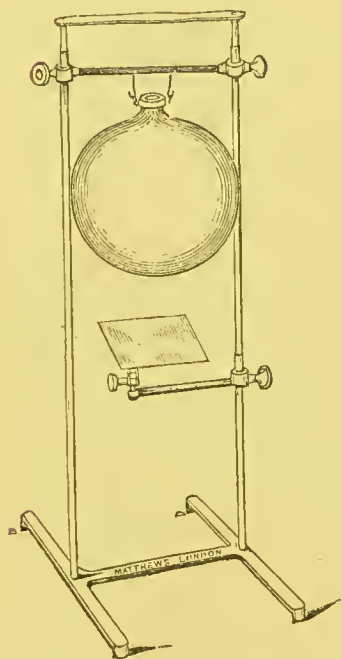
in doubtful and important cases should receive the preference when obtainable.

Sometimes direct light is employed for illumination, and the reflector is dispensed with. In that case the light is placed opposite to the patient's mouth, but has to be tolerably close to it, which renders it inconvenient. For manipulation, reflected

light will be found in every way more convenient than direct light. Experience will soon teach the practical value of this maxim.

For concentration of light, Turek and Stoerek use large glass globes filled with water; and so does Dr. Walker, of Peterborough. The metal frame adapted to the globe by the last-named is the most elegant and convenient, and is sold by Matthews, Portugal Street. It is represented in Fig. 7.

FIG. 7.



Walker's Light Concentrator.

The electrical light has been used for the purpose

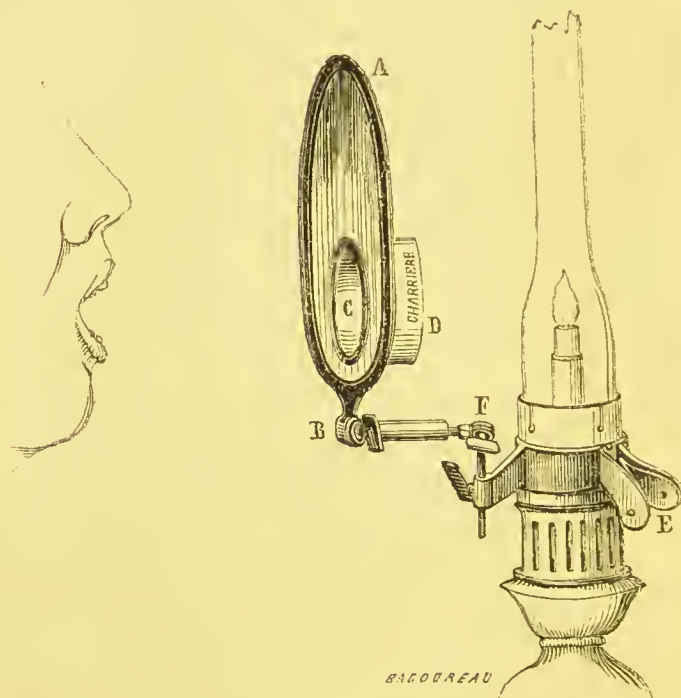
of illumination; and so have the oxyhydrogen and the magnesium lights. The last has been employed for the purpose of taking photographs of the interior of the larynx. Fauvel, of Paris, employs the oxyhydrogen lamp in his clinique, which gives a very powerful light. It, as well as the magnesium light, necessarily alters the colour of the image of the larynx in the patients examined by means of it.

Czermak described illumination by transparency, which consisted in the examination of the larynx when sunlight was concentrated upon the side of the neck. The pink colour of transmitted light can be seen, as when the hand is held up to the sun (or even artificial light), but no image of any kind can be distinguished in the laryngeal mirror. This experiment I would denominate one of the curiosities of laryngoscopy.

A *pharyngoscope* has been contrived by Dr. Moura-Bourouillou, of Paris, for examining and illuminating the pharynx. It is represented in Fig. 8, and consists of a lamp and reflector for illuminating one's own pharynx. A, B, represent the mirror in which we examine ourselves, with a movable joint at B; c is an opening to permit the passage of the luminous rays concentrated by the lens at D; D is the lens for concentrating the light from the flame of a lamp or a candle, and to transmit

it upon the faee, into the mouth, upon the teeth, the laryngoscope, &c. E, F, represent the pharyngoscope-

FIG. 8.



Moura Bourouillou's Pharyngoscope.

holder, a collar of copper, with an arm having two joints, which allows of varied motion and position, as the usage of it may require. The faee is seen opposite to the mirror. This is a most ingenious and a very simple instrument, and is deseribed in the work of the inventor.

In employing artificial light for the purposes of illumination, the room may be darkened by pulling down the usual linen blinds. If the day, however, is sunny, the sun unavailable, and the room too light even with the blinds down, the curtains may be drawn; or, what is better still, an inner set of dark-green blinds may be used, which I have found very convenient, and preferable to ordinary curtains.

CHAPTER III.

EMPLOYMENT OF THE LARYNGOSCOPE.

Mode of Examination.

THE person to be examined should be seated upon a chair, in an erect position, at the side of the table upon which is placed a lamp. His mouth should be on a level with the nose or eyes of the operator; and the flame of the lamp ought to be on a level with the operator's eyes, or even a little higher.

The position being rendered easy and comfortable, the mind of the person calm and assured, the head inclined a little backwards and body forwards, the operator's face being about twelve or fourteen inches from the person's mouth according to the focal distance, he requests him to open his mouth widely, and regulates the position of the reflector so as to concentrate the rays of light into his mouth, and at the same time gets a view of the fauces with a good circle of light.

The tongue should now be protruded, and gently

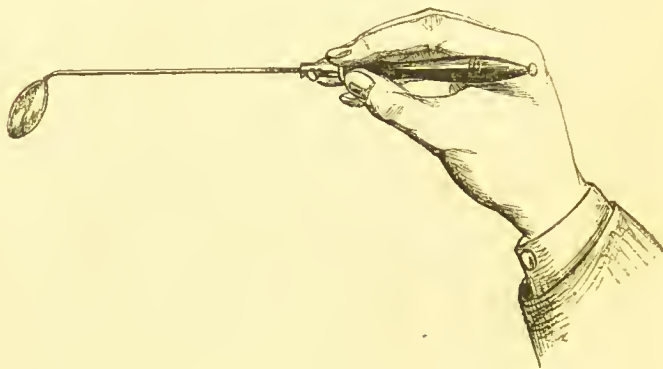
yet firmly taken between the finger and thumb of the operator with his left hand, by means of a small napkin,* towel, or eambrie handkerchief, and held outwards and downwards, taking eare not to press too hard against the lower teeth. The patient himself is sometimes required to hold out his tongue, or he may simply press it against the lower lip and ehin: in eases requiring it, it is necessary to have the tongue held out by an assistant. Now and then protrusion of the tongue ean be dispensed with, when the person has such eommand over it that he ean bury it in the floor of the mouth.

The proper foecal distanee being ascertained by movement of the head forwards (whieh beecom es quite natural after a while), the mouth being opened as widely as possible, and the head inelined a little upwards, the operator now takes a small laryngeal mirror into his right hand, warms its reflecting surface over the ehimney of the lamp on the table, and introduces it into the mouth quiekly yet gently, applying it against the centre of the soft palate upon the uvula, taking eare to avoid eoming in contaet with the tongue and baek of the pharynx. The handle of the mirror should be held like a pen, as in Fig. 9, between the forefinger and thumb;

* A pile of these should be always handy, so that every patient gets a fresh one.

and on its introduction, both it and the hand should be kept to the left side of the mouth out of the way of the light, the person breathing quietly as usual. The posterior surface of the mirror takes up the uvula, which is pressed gently upwards, and which forms a rest or pivot for manipulation in obtaining the proper angle for reflecting the image of the parts desired to be seen; and it can be steadied, when

FIG. 9.



The manner of holding the Laryngeal Mirror.

the proper view is obtained, by resting the little finger alone, or it and the ring-finger together, against the cheek. Practice makes the observer familiar with the exact angle requisite to obtain a view of the larynx; and the steadiness of the light becomes second nature, when the experimenter has gained complete control over his head and the reflector before it.

The observer should practise the introduction of the mirror with both hands, applying the same rules for the left as the right hand: this is absolutely necessary when it is desired to see the application of remedies, or for the performance of any little or great operation upon the interior of the larynx. My experience leads me to believe that, as a rule, with those who possess complete ambidextrous powers, the left hand holds the mirror with more firmness and steadiness than the right.

In warming mirrors, those of glass, as already stated, may be held over the flame of the lamp, and those of metal may be dipped in hot water. Warming both by the aid of the lamp will be found the simplest method; but the temperature *should be carefully estimated* by applying the back of one to the cheek or temple, in preference to the hand, and not introduced if actually hot, for nothing is more obnoxious to a patient; and, unfortunately, many persons warm the mirrors and immediately introduce them into the throat without taking the precaution just mentioned. When properly warmed, the mirror can be retained in the mouth sometimes for several minutes previous to withdrawal. The object of warming the mirror is to overcome the inconvenience of the deposit of moisture during expiration, which immediately ensues when the tem-

perature becomes lower than that of the expired air. To obviate this, Dr. Buzzard advised the brushing over the mirror of a film of glycerine; but this is worse than the inconvenience which it proposes to remedy. Dr. Henry G. Wright's ingenious plan of keeping the mirror at a uniform temperature by means of the electric current is certainly preferable; but neither of these plans is necessary, because the mirror is kept in the mouth just long enough to make the desired examination, and that is generally accomplished long before the moisture becomes deposited upon its surface.

A few hints to the student may here be useful in acquiring the art of examination. The tongue should not be pulled out too forcibly, nor should the depressor be used to get it out of the way: indeed, it will only push the back of the organ against the pharynx. The mirror should not be roughly shoved into the person's mouth, for it is followed by immediate resistance and choking. Nor should it be kept too long in the mouth—a great error with beginners. A steady, unshifting position should be maintained, and the mirror should not be forcibly pressed against the pharynx, a very sensitive part, and liable to be followed by retching. When retching occurs, a patient is not so well under control, as irritability of the fauces is then set up, with more or less conges-

tion. Better to renew attempts at intervals under such circumstances. The mirror should not come into contact with the tongue; for, in the first place, it becomes tarnished with mucus, and in the second it gives rise to irritation and retching. As a rule, an arched direction should be taken with it, along the curve of the hard palate. If the tongue and soft palate are in contact—a condition not unfrequently associated with a very pendent velum in adults—the patient must be requested to breathe solely by the mouth, and not the nose; in which case, the velum rises somewhat and the mirror can be applied. Vowel-sounds will not elevate the velum so much as breathing by the mouth: and if this cannot be done, the nose may be pinched by the patient himself, and the air will enter by the mouth. (In patients who arch up the tongue and prevent an examination, Sir Thomas Watson directs them to practise by sitting in front of a looking-glass with their mouths open; they become thus able to control the movements of the tongue.) An elongated uvula is a great inconvenience to a beginner, from its curving under the mirror and being the chief object reflected; the utterance of an acute or falsetto note will help to get it up out of the way, so that the mirror will be clear.

Pendency of the epiglottis is a great obstacle to

inspection of the interior of the larynx; it is the great stumbling-block to the practice of laryngoscopy, and, unfortunately, is often present in cases about which we are the most anxious. In the examination of many hundreds of healthy individuals of both sexes and all ages, from the child to the old man, I found that it occurred in *eleven per cent.*; that is, eleven persons in every hundred of those apparently in the enjoyment of good health possess a pendent epiglottis. This pendency varied from an oblique, very much or semi-pendent, or nearly quite horizontal position; and this was observed during passive examination with the laryngoscope, independently of the act of swallowing, of phonation, or of any motion in the structures of the throat, and carefully observed when the tongue was protruded forwards and held outside of the mouth.* It is frequently congenital and hereditary, for I have noticed it in the mother and her child; in the young it is a matter of the greatest inconvenience, and of danger to life on passing through the diseases of childhood, especially

* The hitherto received opinion that the epiglottis is naturally in the erect or vertical position, has been disproved in papers by the author brought before the *British Association for the Advancement of Science*, at Cambridge in 1862, and at Newcastle in 1863. See 'Transactions' for those years; also 'Archives of Medicine' for 1863 and 1864, and various journals and papers.

those likely to involve the throat. To some extent, this condition of pendency of the epiglottis explains the prevalence of throat affections among mankind.

By the last census, the population of Great Britain was determined to be 28,887,519; eleven per cent. gives the number of 3,177,627 persons who have not a verteal or erect epiglottis. Can it be wondered at that diseases of the throat are so very prevalent, when the key-stone to the respiratory arch is shifted in its position? It is probable that in some countries—those within the tropics, for example—the percentage might be even more than has been found to prevail in this country.* The student, therefore, must be prepared to meet with this obstacle; and if the patient cannot elevate it by sounds, a slight cough, a laugh, a hem, or a sudden expiratory effort will help to raise it. It is now and then necessary, in cases where the pendency is hopelessly persistent, to make use of an instrument to elevate it, described in another chapter; but it is the most difficult of application of all that we use, from the great sensibility of the parts. The laryngeal mirror under these circumstances must be introduced lower down, which in most cases will permit of a view of the arytenoid

* For much information upon this interesting subject the reader is referred to the author's larger work on 'Diseases of the Throat and Windpipe.'

cartilages, which may or may not help us to form an opinion as to the condition of the interior of the larynx.

Irritability of the fauces—most complete in cases of phthisis laryngea—is also a great impediment to the inspection of the interior of the larynx. It may be avoided by short and rapid examinations, and adopting such precautions as have been already considered. When it depends upon some spasmodic condition of the muscles of the throat, which also causes the back of the tongue to rise on introducing the mirror, full doses of the Bromide of Ammonium will much lessen or wholly remove it, and at times they produce anæsthesia of the mucous membrane.* This has been seen now so many times, that this agent has come into general use for many irritable throat diseases. An agent suitable for immediate use is the sucking of small pieces of ice for a few minutes (eight or ten), or eating two or three ice-creams before coming for consultation—always an agreeable and a grateful agent to employ. A few whiffs of chloroform have been recommended by Dr. Routh, when no other agent is at hand.

Enlarged tonsils require the use of a small or a narrow mirror and much gentleness in its application

* A gargle containing Bromide of Ammonium I have found to produce moderate anæsthesia in twenty-four hours.

to the very young, in whom pendency of the epiglottis is frequently a concomitant. The rising up of the back of the tongue, noticeable especially in females, is sometimes an inconvenience very difficult to overcome; but the best remedy for it is breathing through the mouth, and not the nose: the patient must forget she has a nose. With children, it is well to let them see the mirror introduced into one's own mouth before using it upon them, and they permit its use with more confidence.

Examining in bed.—In using the laryngoscope upon a very sick person reclining in bed, and too ill to sit up, all that is necessary is to have a lamp held by an assistant upon or near the pillow. The operator sits partly across or upon the side of the bed, and leans forward over the patient, who has simply to open his mouth; the rays of light are reflected into the throat, and the laryngeal mirror is employed in the usual way. With a little management, the process is a simple one. On one occasion it was my duty to examine a lady a little while before death in this position.

CHAPTER IV.

THE PHILOSOPHY OF THE LARYNGOSCOPE.

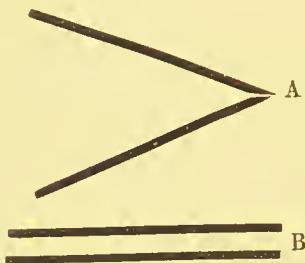
A FEW words are necessary upon the subject of the philosophy of Laryngoscopy. It simply consists in the reflection of the larynx in the mirror in a reversed position—that is, when the laryngeal mirror is introduced into the back part of the mouth, the image of the larynx is seen inverted or reversed, and there is an apparent (but not real) alteration in the position of right and left. The inversion of the image is, of course, regulated by the well-known law in optics, that the angle of reflexion is equal to the angle of incidence, on the impinging of the rays of light on to a plane surface. The inversion is regulated and controlled by this law, here as elsewhere; and the angle of inclination of the plane surface of the mirror will give a perpendicular, oblique, or almost horizontal view of the reflected image at the will of the experimenter. It will answer all purposes to state that the anterior part

of the larynx—the glottis, for example—is seen to be posterior in the mirror, and *vice versâ*. The right arytenoid cartilage is seen on the left side of the mirror and the left on the right. And as the drawings of these parts are now universally given as they appear to be reflected, the student must remember that, in describing or inspecting the larynx, what he sees in the mirror must correspond with the position of his patient. The mind soon becomes familiar with this, however, and mistakes are easily avoided.

Strictly speaking, it is an advantage when the rays of light are reflected from the reflector into the laryngeal mirror at or near upon a level with the eye, as then the most correct view is obtained of the image, for the line of vision is then parallel with the rays of light. This is seen with the reflector before the eye or the centre of the face. If the reflector be upon the forehead, the rays of light and the line of vision are not parallel, although both are brought to a focus in the laryngeal mirror; the consequence is, that a perfectly correct image (optically) is not obtained; but perhaps it may be said, nevertheless, that it is good enough for all practical purposes. The difference may be estimated between parallel and divergent rays by the annexed figure (Fig. 10). The divergent points of Δ repre-

sent the forehead and the eye, whilst the convergent point does the image in the laryngeal mirror. Two parallel lines (B), on the other hand, are necessarily associated with strictly exact and correct reflection.

FIG. 10.



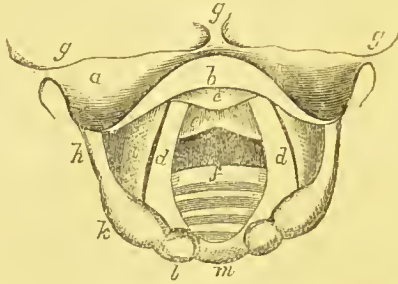
As showing the points of difference in the incident angles of reflection, we may refer to the practice of autolaryngoscopy for demonstration, by any of the modes described in Chapter VI, when it will be apparent that those looking into the laryngeal mirror in the mouth from the front of the experimenter, and those seeing the reflection of the mirror and its image from behind the same person in the oblong glass in front of him, will necessarily see it different in both. Nevertheless, the main features of the object examined are the same, although strictly there must be some difference in the size and angles of its reflection, as seen by the two sets of observers.

CHAPTER V.

REVELATIONS OF THE LARYNGOSCOPE.

BEFORE examining the pathological or abnormal conditions of the throat and larynx, it is desirable to possess an acquaintance with those parts in a state of health. We shall therefore proceed to consider, what does the laryngoscope reveal in healthy persons? It must be premised that in the examination of different individuals the parts about to be described are not seen at once, nor in regular order; some will be visible in the laryngeal mirror, whilst others will not; in some the examination is extremely clear and distinct, in others imperfect and unsatisfactory. Most usually, the back of the tongue and the tip of the epiglottis are presented to view; as the age progresses, so will a ready and immediate view be obtainable of the vocal cords, the interior of the larynx, and the rings of the trachea to the bifurcation in some persons. The parts shall be taken in their order of reflection.

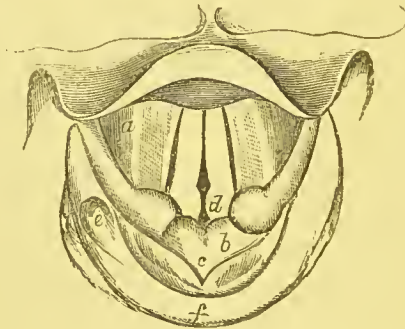
FIG. 11.



View of the larynx in a state of repose and silence, as seen in the laryngoscope.

a. Upper or lingual surface of the epiglottis. *b.* Lip of the epiglottis on its laryngeal surface. *c.* Cushion of the epiglottis. *d.* Vocal cords, on the outer side of which is a dark line, the entrance of the ventricles. *e.* Cricoid cartilage. *f.* Trachea. *g.* Glosso-epiglottic folds. *h.* Aryteno-epiglottic fold. *i.* Regulator of the glottis (false cord). *k.* Cartilage of Wrisberg. *l.* Capitulum Santorini, forming the apex of the arytenoid cartilage. *m.* Arytenoid commissure.

FIG. 12.



View of the larynx during the act of phonation, as seen in the laryngoscope. The same parts above the glottis are seen as in Fig. 11, only that the glottis is closed whilst sounds are being uttered, and the larynx above the glottis forms a sort of hollow, with the walls somewhat approximated.

a. Vestibule of the larynx. *b.* Capitulum Santorini, below which is the arytenoid cartilage. *c.* Arytenoid commissure. *d.* Vocal process. *e.* Cornu of hyoid bone. *f.* Pharyngeal surface of cricoid cartilage.

Tongue.—The back of the tongue is a prominent object, and always seen, with its large and (in some persons) elevated papillæ. It occasionally projects backwards, and pushes the epiglottis downwards, so that its mere tip only can be observed, and the larynx is wholly concealed. On the other hand, when the epiglottis is in some degree pendent, the hollow spaces (valleculæ or vallecular fossæ) between it and the root of the tongue, on either side of the glosso-epiglottic folds, are distinctly seen. These fossæ are of a pale drab colour, and possess a slight amount of secretion, varying according to age. The papillæ and mucous glands at the back of the tongue are sometimes so large as to overlap the thin edge of the epiglottis when pressed against the tongue.

Epiglottis.—As has been already stated, the position of the epiglottis varies very much in different individuals; in eleven out of every hundred persons it is not vertical, being wholly or partially pendent, so that its lingual surface is readily seen; and its shape is found to vary, being broad or narrow, curled under on either side or quite flat, and a little elongated, but very little shortened.

The upper or lingual surface of the epiglottis is of a drab or pinkish-drab colour; its tip or apex, when vertical, with that part of the laryngeal surface seen

generally turned up, is of a bread-yellow colour,* whilst its *cushion*, or projection below the tip, is of a pinkish-yellow or a deep pink. When the epiglottis is sometimes seen in its entire laryngeal surface it is observed to be a pinkish-drab throughout, or even a bread-yellow, but in the mirror (from slight causes) it is *seen* sometimes converted into a bright red. This bright red colour is *not* the normal appearance of the laryngeal surface of the epiglottis; the student must not be misled upon this point. He can readily determine the truth of it by examining ten or twenty healthy persons, one after another.

As generally seen, the apex of the cartilage is presented to view, with the outline of its free edge inclined forwards against the tongue. It has then a foliated appearance, with a variation in the line of its curve on either side. Its upper part in some persons is broad, with a little notch in the centre.

Aryteno-epiglottic folds.†—These folds are gene-

* Resembling that of crust of bread.

† Objection has been made to the term *aryteno-epiglottidean*, on account of its length; but as it is perfectly significant of the parts it is intended to imply, as the student has been taught in his first principles of anatomy, it is not desirable to abridge it more than has been attempted above. What would the anatomist say to the term *thyro-arytenoid* being abbreviated to *thyro-ary* muscle. Such extreme alterations are not justifiable in scientific nomenclature.

rally seen in the laryngeal mirror, and possess much significance as forming the lateral boundaries of the aperture of the larynx, extending from the root of the epiglottis to the arytenoid cartilages. In their direction they are seen to take a course obliquely downwards and backwards, and their width varies according to their degree of tension; thus, they will be broad when relaxed and narrow when tense. The latter is seen when acute vocal sounds are uttered and the vocal cords are approximated. Their colour is a very pale pink.

Arytenoid cartilages.—These are the most conspicuous bodies connected with the larynx, next to the epiglottis, and are seen in the mirror generally surmounted by the *cornicula Santorini*, very small cartilages, which form their apices, and serve to lengthen the arytenoids in a vertical direction; these *appendices* are round and exceedingly small, and are almost lost to view in some persons. The arytenoid cartilages possess a triangular or oval form in the mirror, and in their action during phonation and voluntary action of the muscles are seen to rotate from without, forwards and inwards, according as the glottis is opened or shut. They are of a deeper pink colour than the aryteno-epiglottic folds, but are often of the same colour. When the glottis is open, in tranquil breathing, a space is seen

between the two cartilages, smooth and rounded; this space is closed on their approximation, and the inter-arytenoidal fold of membrane projects backwards, and is seen to assume the shape of an inverted A. This is of the same colour as the aryteno-epiglottic folds.

Cartilages of Wrisberg.—Rarely are these cartilages seen in perfection in the white man, but commonly so in the negro. Not infrequently they are wholly absent, or but a mere trace of them is discovered. They exist midway in the aryteno-epiglottic folds, rather towards the arytenoid cartilages. They are round and prominent bodies, of a yellow colour, and resemble a little abscess on the point of bursting. Their appearance is unmistakable when well developed.*

Regulators of the glottis.†—These are formed by

* They are characteristic of the negro race, and, with some other peculiarities in them, are described in a memoir by the author, in the second vol., 'Trans. Anthropological Society of London.' See also 'Trans. Brit. Assoc. for Advancement of Science,' meeting at Bath, 1864.

† With the desire of co-operating with my brethren of the English school, I shall henceforth discard the expression of *false vocal cords*, and of the terms used in anatomy of *superior* and *inferior ligaments of the larynx*. Nevertheless, I object to the term of *ventricular bands* proposed for the *false vocal cords* by Mackenzie, because that is not their true signification, as the anatomist must be aware. The ventricles are fissures or receptacles in the

the upper division of the *triceps laryngea** muscle, covered by folds of mucous membrane of a pale pink or delicate rose colour. They line the lateral boundaries of the larynx, and extend in an antero-posterior direction from near the angle of the thyroid cartilage close to the root of the epiglottis, to the arytenoid cartilages.

Vestibule of the larynx.—The concavity observed on the upper surface of the regulators of the glottis, in quiet breathing, with the vocal cords slightly approximated, has been named the vestibule of the larynx. It is especially observable in the approximation of the regulators during the act of voluntary closure of the larynx, when the breath is suspended for a few seconds.†

thyro-arytenoid muscles, and these latter do not form *bands* to them. These muscles—*triceps laryngea* of Battaille—are the *regulators of the glottis* in every possible sense, and that term appears to me to be the most suitable and expressive, and necessarily implies the bulky portion of the muscle, above the ventricles, which approximates and closes the upper cavity of the larynx in its contraction on meeting with its fellow of the opposite side.

* For an account of this muscle, with its division into three bundles of fibres by Battaille, see a paper by the author on the various forms assumed by the glottis, in the 'Lancet' for October 15th, 1864.

† See the author's papers "On Voluntary Closure of the Glottis, independently of the Act of Breathing," in 'Trans. of Brit. Assoc. for Advancement of Science,' Newcastle meeting, 1863.

Ventricles of the larynx.—These are readily seen in many persons as dark lines on the outer margin of each vocal cord, between the latter and the regulators of the glottis. Continued vocalism in autolaryngoscopy gives the finest view of them. In the larynx of most negroes a view can be obtained of their interior from the obliquity of their position.

Vocal cords.—They are distinguished as two long narrow bodies, possessing a pearly white glistening appearance, extending from the angle of the thyroid cartilage to the base of the arytenoid cartilages. They are unmistakable; a tinge of grey is sometimes imparted to their brilliant white colour. They are seen flat, with a slight convexity on their surface. Their width varies according to the view obtained of the larynx. They are intimately in contact at their origin in some persons, and in others there is an interval of from one line to a line and a half. Their straight appearance is altered by the direction of the vocal process (the angle at the base of the arytenoid) outwards during inspiration, giving to the glottis a lozenge shape, as Czermak pointed out. During expiration this process is turned inwards. Longet gave the portions of the glottis thus divided by the vocal process the names of the inter-cartilaginous and inter-ligamentous glottis.

The glottis.—This is an antero-posterior fissure,

bounded by two brilliant pearly borders—vocal cords—which sometimes move with surprising rapidity. During quiet inspiration the glottis has a triangular form, with a base of about two lines long. During phonation the vocal cords approximate throughout their length and become parallel. A slight fissure posteriorly is observed if the sound is a low one. A high falsetto note so permits of closure of the glottis as to prove the test of its integrity, and permits the appreciation of the amount of approximation which the vocal cords undergo. If the breath is suspended for a few seconds, and voluntary power is exerted, the glottis can be seen to open and shut with great rapidity, like the working of a pair of scissors.*

According to circumstances, the glottis is seen to assume in various persons a triangular, lozenge, oval, oblong (narrow), elliptic, or lanceolate shape, and may possess great activity in motion or very little.

Sub-glottis.—Beyond the glottis the broad ring of the cricoid cartilage comes into view, and then the successive rings of the trachea, seen generally pretty

* The author has the most perfect control over the muscles of his own larynx, and in him this can be seen in a remarkable manner, as well as the approximation of the regulators of the glottis, after that of the vocal cords has taken place.

far downwards. The shade of colour which the cartilage of these assumes is a yellowish drab, with the intervening mucous membrane of a pale pink. In some persons the bifurcation of the trachea is seen as a bright line, with a dark circular space on each side, which are the openings of the bronchial tubes, and, occasionally, the light is transmitted into the right bronchus, and, in much rarer instances, even into the left.*

Pharynx.—The posterior part of the cricoid cartilage on its pharyngeal aspect is readily distinguished on suitably inclining the laryngeal mirror, and this is a part necessary to become familiar with, as the occasional seat of lesions. The lower boundaries of the arytenoid cartilages and inter-arytenoidal space in consequence become visible, together with the projection of the convexity of the mucous covering over the cricoid cartilage.

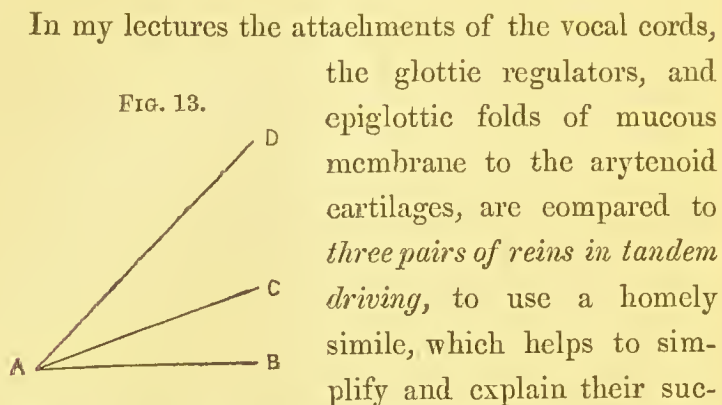
On either side of the larynx is a groove or fissure,

* This is still deemed quite problematical by sceptics. Let those who doubt it try the following experiment:—Place a sixpence on the floor in a dark room, near the corner of a table, throw the rays of light from a reflector on to a laryngeal mirror placed beyond the corner of the table and held in the ordinary way. By directing them on to the proper site of the sixpence the reflection of the coin is at once seen in the mirror. Let the sceptic remember that the length of the trachea is but a few inches, and compare it with that between the table and the sixpence.

readily seen in the laryngeal mirror, which is a favorite locality for fragments of food, raisin-stalks, and other substances. They can be usually seen in the mirror, and if not they can be felt with the finger. The fissure has the pharyngeal wall on the outer side and the fold of the epiglottis on the inner, and generally the horn of the hyoid bone can be felt at the bottom.*

Deglutition.—The mechanism of swallowing, and the part which the larynx plays in it, can be beautifully seen in the laryngeal mirror, readily demonstrable with a little practice. Three distinct actions are noticeable:—*First.* The arytenoid cartilages approach one another the whole length of their internal surfaces, and shut the glottis with great energy, bringing the edges of the vocal cords in contact. *Second.* Almost simultaneously, the regulators of the glottis (false vocal cords) approach one another, enter into contact in the median line, compress the ventricles, and completely cover up the glottis. *Third.* The epiglottis is drawn backwards (by contraction of the aryteno-epiglottic muscular fibres), and applies its base or cushion, and then its posterior and inferior surface, upon the closed vocal cords and regulators. At this instant the base of the tongue covers all up, and nothing further can be seen.

* See second edition of my work 'On the Throat,' &c., p. 404.



In my lectures the attachments of the vocal cords, the glottic regulators, and epiglottic folds of mucous membrane to the arytenoid cartilages, are compared to *three pairs of reins in tandem driving*, to use a homely simile, which helps to simplify and explain their successive action. Thus, let A B C D represent a longitudinal section of the larynx, of which A is the arytenoid cartilage; A B is the equivalent of the vocal cords, A C of the glottic regulators, and A D of the aryteno-epiglottic folds of mucous membrane in which are contained the muscular fibres running from the arytenoid cartilages to the epiglottis. The action of A D and of A C cannot occur without the action of A B; therefore the action of A B must precede the action of A C and A D. The consequence is that A B is first excited to action and closes the glottis, forming the first pair of reins; this is instantly followed by the action of A C, the second pair of reins, approximating the glottic regulators; and thirdly, by that of A D, in drawing down the epiglottis to cover all over with the third pair of reins.

These relative and successive movements are proved

and confirmed by the exercise of voluntary power over the muscles of the larynx (already referred to), when the breathing is suspended for a few seconds; for when the glottis is seen to be kept firmly closed the glottic regulators approximate, and the epiglottis is gradually drawn downwards, as in deglutition.*

* My views were accepted upon this subject at Newcastle, in August, 1863, by the Physiological Section of the British Association for the Advancement of Science, the facts and arguments brought forward as correlative evidence fully establishing their correctness.

CHAPTER VI.

SELF-DEMONSTRATION WITH THE LARYNGOSCOPE, OR AUTOLARYNGOSCOPY.

FAMILIARITY with the laryngoscope and a perfect control over its use may be obtained in two ways. In one by the practice of autolaryngoscopy—the inspection of one's own larynx. In the other by examining a number of healthy persons together, forming small parties, of both sexes and various ages. This latter may be called the social aspect of the laryngoscope.

For the practice of autolaryngoscopy, or the examination and exhibition of one's self, besides the reflector and the laryngeal mirror, another mirror is required. As can be readily understood, the image of the larynx must be reflected from the laryngeal mirror into another mirror, and seen by the experimenter himself as well as by others. This can be readily accomplished in several ways.

Garcia turned his back towards the sun, and by

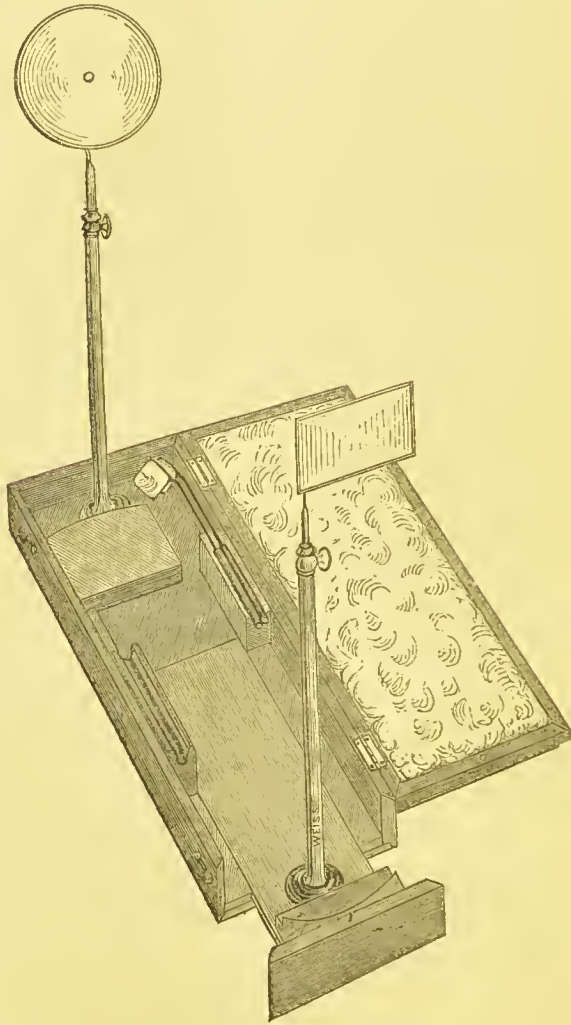
means of a small mirror held before the face received the solar rays in it, and directed them on the laryngeal mirror placed against the uvula, which reflected the image into the other mirror. This method has the advantage of simplicity for sunlight, and only two mirrors are required.

Czermak, in his early attempts with artificial light, employed another method with two mirrors, which is available for the student in his chamber. The flame of a lamp with a glass chimney is placed as close as possible to the mouth held widely open; a small hand-mirror is held with the left hand between the eyes and flame, which receives the reflection of the image in the laryngeal mirror illuminated by the rays of the lamp. The pharyngoscope of Moura-Bourouillou (Fig. 8, p. 36) might be used in the same way, with this advantage, that the mirror is perforated, as already described, thus allowing the rays of light to pass directly to the pharynx, and one hand only is employed to hold the laryngeal mirror.

For demonstration and autolaryngoscopy, Czermak contrived a special apparatus, which, as modified and certainly much improved by Weiss, is shown in Fig. 14. It consists of a mahogany box, at the bottom of which is a sliding panel, to which is screwed a perpendicular brass tube, which permits

of the attachment of a large perforated reflector, at any height the most suitable. Opposite to this is a

FIG. 14.



Czermak's Autolaryngoscope.

receptacle for another perpendicular tube, which receives the stem of a quadrilateral mirror, attached by means of a hinge for suitable angular adjustment. The mirrors are about a foot apart.

The light is placed to one side of the demonstrator, and throws its rays into the large reflector, which reflects them into the laryngeal mirror held against the uvula with the right hand. The observer looks through the perforation or around the margin of the large reflector, whilst the demonstrator looks into the quadrilateral mirror. Both see the image in the laryngeal mirror.

This apparatus has the advantage, that a large number of persons can see the laryngoscopic image by clustering around the reflector, and at the same time others behind the demonstrator by looking into the quadrilateral mirror. With it I have given demonstrations at single sittings to parties of from a dozen to ninety or more persons, and all have had a good view of the interior of the larynx and trachea. For general convenience, handiness of arrangement, regulation of light, and accuracy of physiological observation, this apparatus is to be recommended as preferable to any other. For lecturers on physiology, Czermak's autolaryngoscope,* as modified by Weiss, is indispensable.

* Its charge is moderate, and it is sold by Weiss, in the Strand.

The experimenter must take the precaution of having the reflector at a higher elevation than the mouth, to throw the rays of light in a direction downwards into the throat; a fair guide will be to have the lower margin of the reflector in a line with the eye.

The laryngeal mirrors for autolaryngoscopy vary in size from three quarters to an inch and three quarters in diameter. A medium size will be convenient.

Dr. George Johnson performs autolaryngoscopy by a method which is exceedingly simple and convenient, as well as easy of execution. The ordinary reflector on the forehead, and the laryngeal mirror, with a common looking-glass and a lamp, constitute the whole of the apparatus. The looking-glass is placed upon a table at a distance of eighteen inches from the demonstrator, and a moderator or gas lamp on one side of the glass, but two or three inches further back. From the reflector on the forehead the light is thrown into the image of the demonstrator's open mouth in the looking-glass. The laryngeal mirror is then introduced into the mouth, and the reflection of the experimenter's larynx is seen in the looking-glass by himself and the different persons around him.

In this method, and, indeed, some others, except-

ing Czermak's, the glare of light is sometimes inconvenient. This may be obviated by wearing a green shade over the eyes in such a way that, whilst they are protected, vision forwards is not interrupted.

The ordinary toilet or looking-glass may even be dispensed with, in Johnson's plan, for a circular or square mirror, placed upon the top of a perpendicular metal tube fixed to a tripod stand, and capable of being heightened or lowered at will. The reflected image of the larynx may be seen by persons behind and in front as well as by the experimenter himself.

Dr. Walker, of Peterborough, employs a glass globe about six inches in diameter, supported on a metal frame, for concentrating the rays of light of a lamp placed immediately behind, upon any object placed in front of it, the light being most brilliant at a distance of from 12 to 20 inches from the globe. A small plane mirror, 3 by $2\frac{1}{2}$ inches, is attached to a sliding arm, and, when placed in front of the lower part of the globe, the observer can obtain in it a perfect view of the image of his own larynx, which can be seen by several other persons as well. Or by employing the laryngoscope upon another person seated nearly opposite to the condenser, the image of the larynx can be seen by several persons both

behind the observer and in the little glass in front of the condenser already alluded to.* (See Fig. 7, p. 34.)

FIG. 15.



Smyly's Monocular Demonstrator.

The same mode of demonstration has been applied by Dr. Smyly, of Dublin, in the addition of a simple square glass mirror, set in brass (like the concave

* This ingenious apparatus of Dr. Walker's can be obtained of Matthews, in Portugal Street, Lincoln's Inn. See Dr. Walker's 'Clinical Application of the Laryngoscope,' 1864.

reflector), to one of Weiss's frontal bands, as is shown in Fig. 15. It is fastened by means of a second split tube to a brass rod at an angle of 45° . This rod holds both the square mirror and the reflector, and, when applied as shown in the woodcut, the object to be examined is reflected in the square mirror, and can be seen by others. As may be seen, the right eye of the demonstrator is concealed by the square mirror, and vision is permitted only to the left eye by the perforation in the reflector. The observer has the advantage of seeing the image reflected in the square mirror more perfectly than the demonstrator himself. To this instrument may be given, with all propriety, the name of *Monocular Demonstrator*, for reasons that will strike the reader.

CHAPTER VII.

AIDS TO THE LARYNGOSCOPE.

THERE are various accessory agents which sometimes prove valuable aids in the practice of laryngoscopy, and which help us to overcome obstacles that present themselves to our notice, especially in the treatment of disease.

Of these may be mentioned the self-holder, self-holding reflector, magnifiers, mensurators, sub-glottic mirrors, epiglottic hook, chairs with head-rests, &c., which shall receive a brief notice.

Self-holder.—When it is desired to employ, as it were, three hands in rare cases, one is gained through the agency of an instrument that will hold the laryngeal mirror steadily at the back of the mouth, and to this has been given the name of *self-holder*. Various contrivances have been adopted for this purpose. Turck employs a tripod stand, with a movable arm, to the end of which a laryngeal mirror with a long handle is attached, and when inserted

into the mouth is steadily maintained in its position. For facility of adjustment, a ball-and-socket joint exists about two inches from the portion of the limb of the instrument which holds the handle of the mirror. Lewin and Rauchfuss have described others.

Maekenzie uses a mouth-piece, with a steel band which passes from its upper part, round the head to beneath the occipital protuberance, where there is a broad pad to keep it in position. The mouth-piece consists of perpendicular and horizontal portions; the former rests against the upper lip, whilst the latter is covered with a layer of wood for contact with the teeth. In the perpendicular portion is a groove in which runs a steel plate, with a ring at the extremity, through which passes a perpendicular bar, having two broad steel blades at its extremity. These blades open widely, close by their own elasticity, and hold the mirror firmly. Bruns used one to hold the mirror, whilst he employed both hands to remove a polypus from the larynx of his brother. It consisted of a metal band encircling the head, to which a slender limb was attached, the end of which grasped the stem of the laryngeal mirror near the angle of the mouth. It is one of the most convenient, and is figured in his book.

The plan of a self-holder is an ingenious one, but

there are several objections to its use. In the first place, the mirror has cooled by the time that things are ready for manipulation, whether for local treatment or operation; and in the second, it is extremely rare to find any person who will remain quiet longer than for a few moments. An assistant will be of more service than a self-holder; and if a practical person, he can hold the mirror in the mouth at the time it is required, and thus economise time.

Self-holding reflector.—This is also an invention of Turek's: he employs the tripod stand already referred to, and by means of a long movable arm, to the end of which a reflector is attached, artificial light is thrown into the throat. To those who object to the wearing of a reflector on the forehead or before the eye, this is an excellent substitute. There are occasions when the self-holding reflector would prove a powerful aid, and it should be borne in mind.

Magnifiers.—With the object of magnifying the image seen in the laryngeal mirror, several contrivances have been recommended. Wertheim, of Vienna, was the first to make the attempt—the year after the revival of laryngoscopy in 1859—and advised the use of small concave mirrors for this purpose. These were objected to by Turck, because

in examining parts situated at different distances they should be used of different foci, and their magnifying power he thought but slight. He, however, brought forward a small telescope, fastened to one of the arms of his illuminating apparatus (self-holding reflector) attached to the tripod stand. The reflector being perforated, and the telescope immediately behind it, on regulating the distance a magnified object was obtained. Voltolini used an opera glass, from which he had removed the ocular lens, for magnifying the image; and also a small telescope, from which he took all the glasses except the objective. Good results were obtained by sunlight when the patient's head was held in a firm position.

It is extremely doubtful whether any magnifying power can be employed in the treatment of disease, but for demonstration there is a reasonable prospect of it through the invention of the Chadburn lantern for projecting enlarged images upon a screen, similar to the magic lantern, from opaque objects. Some of my medical readers possibly may remember its application at the Leamington meeting of the British Medical Association in 1865, by Dr. B. W. Richardson; medals, watches, and other objects, were enlarged upon a screen. The light requires to be close to the object exhibited; and if held near the

mouth, with the laryngeal mirror properly adjusted, the exterior of the larynx would be magnified to an enormous size, and depicted upon the screen of the natural colour, showing, also, any of the special motions illustrating the power of voluntary motion over the laryngeal muscles. It might be used to show cases of chronic disease of the larynx, especially polypi and warts.*

Mensurators.—With the object of estimating the exact size of laryngeal objects, Mandl, of Paris, had a scale made upon the glass of the laryngeal mirror, and this was also attempted by Merkel, of Leipsie. The reflection of the image being impaired by the scratching of the glass was considered by Semeleder as a grave objection, and he suggested that the scale should be marked upon the rim of the mirror; he likewise considered such contrivances as these unnecessary. This is, perhaps, more of a refinement than an actual aid to laryngoscopy; nevertheless, its employment should not be ignored, although the distance of the reflected object from the mirror will always prove an obstacle to complete accuracy.

Sub-glottic or tracheal mirrors.—These are employed for inspection of the under surface of the glottis in cases where tracheotomy has been performed

* This lantern may be had direct from C. H. Chadburn and Son, opticians, Liverpool.

to save life. Neudoerfer was the first to propose this mode of examination in 1858, and it was applied upon the living subject by Czermak in the year following.

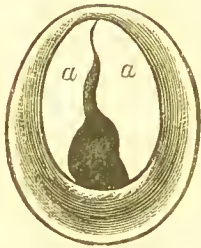
Very small mirrors made of steel are employed; these are introduced into the canula, or into the wound when the canula has been temporarily withdrawn, with their reflecting surface turned forwards and upwards. If introduced into the canula, it is desirable that the fenestrated opening or window on its upper curve should be as large as possible, to permit of easy inspection. The mirrors should be introduced very warm—indeed, warmer than when used for the throat—because they do not come into contact with the structures, and cool very rapidly. A layer of glycerine is, perhaps, desirable on their surface, from this latter circumstance.

The observer sees the parts reversed in position, as when the laryngeal mirror is employed; thus, the right vocal cord is seen on the left, and *vice versa*; the anterior part of the glottis is seen to be posterior, and *vice versa*. The under surface of the vocal cords is not seen to be white, but of a deep pink colour, and pathologically reddened, and their action and mobility reveal their presence. When the glottis, however, is seen open, its triangular shape is observed, and the epiglottis can be distinguished; not

infrequently the rays of light are transmitted upwards into the pharynx.

These last conditions are seldom observed unless when recovery is becoming complete and the canula is about to be removed. In chronic cases I have generally removed the canula, and the sub-glottic space is seen with more ease, and is more distinctly recognised. The parts are generally so swollen that

FIG. 16.



Subglottis, seen from the trachea, and showing the glottis between the vocal cords, *a, a*.

simply two masses of either deep pink or red membrane are visible, meeting in the centre occasionally, with a fissure between them. The prominence of one side or the other is generally greatest at the posterior part of the larynx. The woodcut gives a post-mortem view of the glottis from below in a case of supra-glottic œdema

of the larynx; the under surface of the vocal cords is intentionally made white to distinguish them from the walls of the cricoid cartilage. Mr. T. W. Nunn sent me a case of sub-glottic œdema of the larynx, for which the operation of tracheotomy was performed: on several occasions I examined the patient with the tracheal mirror.

The observer must sit in a lower position than the patient, so that the eye may be brought to a level

with the opening in the trachea, and good uninterrupted light is necessary for the examination. Its importance is sometimes considerable, more especially when a view of the interior of the larynx is impracticable, from a hopelessly pendent condition of the epiglottis.

It is rarely necessary to employ the tracheal mirror for inspection of the trachea, as that tube is for the most part in a healthy condition even when the larynx is so involved as to require tracheotomy. Nevertheless the lower part of the tube, near the bifurcation, is in rare cases the seat of ulceration in cases of phthisis laryngea et pulmonalis, and in one instance I was enabled to diagnose its presence by this mode of examination, and to cure it through topical agency applied by the tracheal wound.

Epiglottic hook or forceps.—One of the greatest obstacles to diagnosis—and in certain cases, after the diagnosis has been completed, to the performance of little operations upon the interior of the larynx—is the pendency of the epiglottis, upon which much stress has been already laid in previous pages. This has thwarted the efforts of various observers as well as myself, and may be considered the most serious stumbling-block to laryngoscopy of any that can be presented to our notice, for many a patient sinks

into his grave through the existence of this state of things.

It has suggested itself to the minds of many persons that, if the tip of the epiglottis could be got hold of, pulled upwards and forwards, and retained in that position even for a few seconds, it would facilitate the carrying out of any operation that was desired. The first person who attempted this, and successfully carried it out, was Bruns,* whose brother was the subject of a pendulous growth beneath the left vocal cord. It was impossible to introduce the instruments for the purpose of removing this until the pendent cartilage was elevated, and this was done by means of an epiglottic forceps with flat blades, which laid hold of the tip and held it up without any resistance on the part of the patient, who had been so schooled by examination that it caused little or no spasm or resistance. The result was perfectly satisfactory, and its application is figured in Bruns' essay published on this particular case.

Others have employed them, as Voltolini, Fournié, Lewin, MacKenzie, and myself. It may be stated, however, as a general rule, that the irritation to which they give rise is so great that their employ-

* 'Die erste Ausrottung eines Polypen in der Kehlkopfhöhle,' &c., von Victor v. Bruns, Tübingen, 1862.

ment has almost completely ceased. Nevertheless, in certain rare cases, as in the brother of Bruns, the application of the epiglottic hook or forceps can be borne, and therefore it must be employed if imperatively required.

Chairs with head-rests.—It is sometimes convenient to steady a patient's head when topical treatment requiring a fixed position is necessary. This can be carried out by affixing to the back of an ordinary chair a movable head-rest, as employed by dentists and photographers. In particular operations it is more convenient to allow of the resting of the head against the chest of a friend, or even to hold it with the hands, which, in females especially, inspires confidence.

CHAPTER VIII.

TOPICAL MEDICATION OF THE LARYNX THROUGH THE AID OF THE LARYNGOSCOPE.

THERE are several modes of applying agents directly to the larynx, either in solution or in a solid form. In solution topical medication can be accomplished through the laryngeal brush (first introduced by myself), a common glass rod, my graduated glass syringe, my fluid pulverizer, and the various fluid atomizers in general use. Solid substances, such as nitrate of silver, the various caustics, and powders, require other modes of application; all these shall be noticed, and examples given in illustration of their good effects.

The laryngeal brush.—When I abandoned the sponge-probang some years ago, and adopted the brush, as a more delicate and less irritating means of applying an agent to the larynx, I was told the change

was a bad one. As time has rolled on, the brush has come into general use, and is now recommended by others as well as myself. No irritation is set up by a soft brush, nor is the delicate mucous membrane scraped or injured by it, as was common with the sponge. When carefully applied, it excites neither spasm nor cough—a great desideratum. A large, full-bellied, camel's or squirrel's hair brush, as shown in Fig. 17, may be readily applied to any part of the larynx with the aid of the laryngeal mirror. The angle at which the whalebone handle is bent is depicted in the woodcut, and the manner in which the brush is fastened upon it is also seen, and is exceedingly simple. A number of whalebone handles can be obtained of any instrument-maker, with a little square knob at the slender end; this knob must be cut round or oval with a pen-knife, and over the flame of

FIG. 17.



The Laryngeal Brush.

a lamp this part of the handle is to be warmed, then bent at the proper angle, and held until it is cool, when the angle is retained. Brushes of a fair size must have the hollow quill portion slit up in five or

six places, so that, after the quill part has been softened by standing some time in water, the slit pieces of quill can readily overlap one another, and be securely fastened by many turns of strong black thread (not cotton); the superfluous ends of the projecting quill can then be smoothed with seissors. These brushes should be prepared by the practitioner himself, and never purchased;* he should possess several dozens of them, of various sizes, and not confine himself to five or six. After use they should immediately be placed in a glass vessel with water, and thoroughly cleansed the first moments of leisure in several vessels of water. They possess a superiority over all other brushes, with aluminium or other handles, as the practitioner can soon convince himself. When much used, the brushes can be renewed from time to time upon the same whalebone handles, and thus obviate any risk of detachment of the hair.

With these most useful and yet simple instruments various agents in solution can be readily applied, and the cure of the majority of cases of laryngeal disease will follow. Of the various agents employed, the solution of nitrate of silver is the most important, and its strength will vary from two scruples to two

* A person who can prepare his own brushes is a fit manipulator for local treatment of diseases of the larynx.

drachms to the ounce of water. Then we have the iodide of silver or *old nitrate bath* of photographers, in which this agent is held in solution. Many other solutions I have found efficacious according to circumstances, such as alum, argento-nitrate of mercury, sulphates of zinc and copper, nitrate of uranium, perchloride of iron, gallic acid, glycerine, iodine, carbolic acid, acetates of zinc and lead.

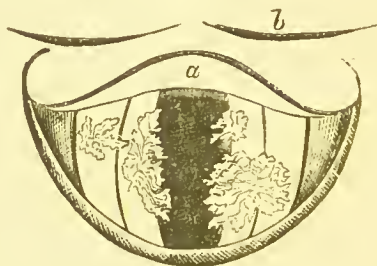
The practitioner must use his own judgment in selecting these agents, and must be guided by circumstances; but, as a rule, when there are varying degrees of inflammation present, some one of the solutions of nitrate of silver must have the preference. The solvent may be water or glycerine; the latter answers better for some, but not all.

Aphonia for twenty-two months, from foliated epithelial growths on the vocal cords and regulators of the glottis; absorption by the persistent application of solutions of nitrate of silver and argento-nitrate of mercury, and restoration of the voice in five months.

CASE 1.—A young man, æt. 24 years, a worker in precious stones, came under my care in July, 1860. He had gradually lost his voice twenty-two months before, and could now utter only a very low whisper. Sometimes for days together there was complete dumbness. Whispering was usually associated with great pain, straining, and tightness of the chest, and discomfort in the thyroid cartilage. The general health was bad; he had contracted syphilis three years ago, with secondary eruption and sore throat.

With a steel mirror* I was enabled to see the laryngeal surface of the epiglottis, and this was before the reintroduction of the laryngoscope into England by Czermak. It was not, however, until October, 1860, that I examined him in the regular way with the laryngoscope, and made out the nature of his complaint. Foliaceous warts were discovered above the vocal cords and regulators of the glottis. One, large and broad, nearly covered the posterior third of the left vocal cord and glottic regulator, overlapping the free border of the former, whilst a smaller one was situated more anteriorly on the free border of the vocal cord. The free border and part of the surface of the right vocal cord was in connection with a long growth, and a smaller one occupied the anterior part of the right glottic regulator. All these are shown in the woodcut.

Fig. 18.



Excrescences on the Vocal Cords and Regulators of the Glottis.

- a.* Epiglottis, beneath which are seen the growths as described.
b. Back of the tongue.

The glottis could not close, and the voice, therefore, was extinguished. The treatment consisted in the topical application, by means of the curved brush, of solutions of nitrate of silver and argentic nitrate of mercury every few days, under which the foliaceous

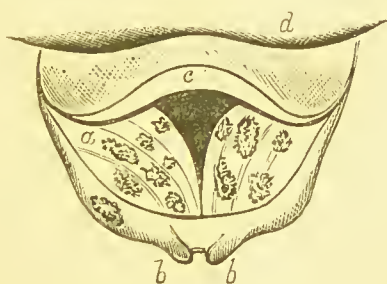
* Figured in the first edition of the author's work 'On the Throat,' published in January, 1860.

growths gradually shrivelled up and were wholly absorbed, the mucous membrane assuming its natural condition, and the voeal eords their power of approximation and vibration. The whisper in the mean time becaune gradually louder and louder, until the voice was natural in about five months; and in two months later he was perfectly cured, and has remained so to the present time. Small doses of bichloride of mercury and iodide of ammonium were given internally for a short period, with advantage. The good effects in this ease were mainly due to the topical use of agents applied by a soft camel's hair brush.

Aphonia from tuberculous ulceration and chronic œdema of the glottic regulators, with dysphagia, in the third stage of pulmonary phthisis; life prolonged some years, through the arrest of the disease in the larynx by topical use of nitrate of silver.

CASE 2.—In October, 1863, I saw Miss C—, æt. about 34 years, in consultation with my friend Dr. Cahill, of Knightsbridge. She was in delicate health, much emaciated, had a cavity in the left lung, but quiescent, and much expectoration, chiefly from the

Fig. 19.



Ulceration and Œdema of the Regulators of the Glottis.

a, a. The œdematous regulators of the glottis covered with ulcers; one is also seen on the right epiglottic fold. *b, b.* The arytenoid cartilages. *c.* The epiglottis. *d.* Back of the tongue.

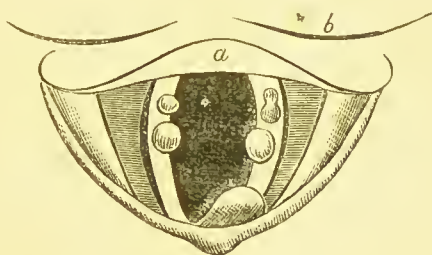
throat. She had dysphagia with fluids, and her throat was very sore; indeed, aphonia and sore throat had been present for some months. A deep red ulcer was present on the right wall of the pharynx. The laryngoscope revealed swelling of the regulators of the glottis, which met posteriorly, and was covered with small ulcers, as depicted in the woodcut. The vocal cords were not visible. The ulcers and œdema of the regulators explained the symptoms, especially the great mucous expectoration. The topical use of a solution of nitrate of silver soon healed up all the ulcers; the dysphagia, expectoration, and throat cough ceased; the lady gained flesh and voice, and survived for three years, losing her life by the chest malady.

Aphonia for three years, depending upon tumours on the surface of both vocal cords, the largest situated near the left arytenoid cartilage; the cure protracted to nine months, but effected by persevering in topical applications.

CASE 3.—H. B—, aged 22, residing in Essex, came up to town, and was treated for consumption at one of the hospitals. She had lost her voice for three years, and was given cod-liver oil, with steel, and was blistered numberless times. She had a slight cough, but said her throat gave rise to it. She spoke in a low whisper, and its softness and tone at times induced the belief that she was suffering from ulceration of the follicles of the larynx, more especially as there was some follicular disease of the pharynx. The catamenia were regular. General health middling, but she did not look phthisical. The most careful examination failed to detect any pulmonary disease. The laryngoscope was used on the 27th October, 1860, and several tumours were found on the surface of both vocal cords—two on the anterior half of the right, but slightly overlapping the free edge of the cord; and four on the left, the largest situated at its posterior part, close to the arytenoid cartilage; another, smaller, was on the middle of the cord; these two, especially the former, overlapped

the free edge of the cord, whilst two very much smaller lay on the surface, on the anterior third of the cord. All are well seen in the drawing (Fig. 20). They were regularly brushed with various

Fig. 20.



Excrescences upon both Vocal Cords.

a. The epiglottis, beneath which are seen the tumours on the vocal cords as described. *b.* The tongue.

solutions, and one by one gradually disappeared. In the interim the voice was slowly returning, but it was not until nine months after laryngoscopy was first practised that the remains of the last and largest growth had completely disappeared, the voice having then assumed its full compass and power.

Six years have elapsed, and the general health and voice have continued perfectly good throughout.

Common glass rod.—In hospital practice sometimes, especially amongst out-door patients, a drop or two of a solution of nitrate of silver can be readily applied by means of a common glass rod. The end of a rod is dipped into a bottle of the fluid, and immediately held horizontally, with a drop or two adhering to the end of it. This is introduced into the mouth and held over the opening of the larynx,

when it is depressed a little, and the fluid falls into the interior upon the laryngeal surface of the epiglottis, and thence on to both vocal cords, or falls on to one or other of the regulators of the glottis. In cases of *chorditis vocalis* (inflammation of the vocal cords) with aphonia, existing a few days or a few weeks, the voice is not infrequently restored then and there, or some few hours afterwards, by this mode of application; as it is not always convenient to use a brush a few times running in hospital practice, a glass rod is a good substitute.

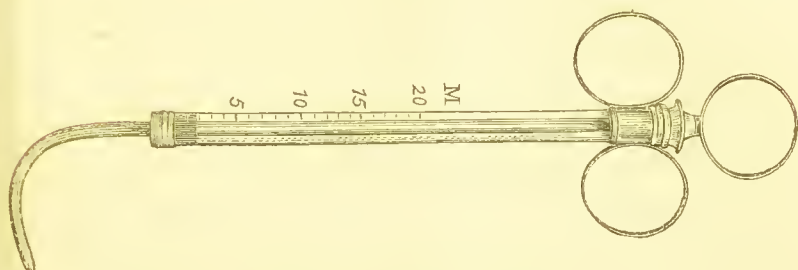
Aphonia from chorditis vocalis of four weeks' standing, originating in cold; recovery of the voice by a single drop of a solution of nitrate of silver.

CASE 4.—M. A. B—, æt. 23, lost her voice from a cold four weeks before she presented herself at Westminster Hospital, and now she had a slight cough as well. She could articulate in the lowest possible whisper. The laryngoscope revealed bright redness of both vocal cords, and no other part of the larynx seemed to be involved. A glass rod was dipped into a solution of nitrate of silver, and a drop of the solution was allowed to fall upon the laryngeal surface of the epiglottis. She felt some warmth to follow, and in a few minutes (four) the voice returned in its natural pitch. In the laryngeal mirror the vocal cords were seen of a whitish colour along their free margins; the removal of the congestion had permitted of vibration. At the next visit, three days after, the vocal cords appeared normal.

Graduated laryngeal syringe.—Small syringes of ivory, glass, silver, and gold, are useful for various

purposes. The annexed figure represents a glass one, carefully graduated, for injecting regulated quantities of fluid into the interior of the larynx or

FIG. 21.



Graduated Laryngeal Syringe.

trachea, such as strong solutions of strychnia, nuxvomica, Calabar bean, &c. One or two minims can be projected on to the vocal cords with the aid of the laryngeal mirror, and the instrument can be so held that certainty of application can be relied upon. The curve of the tube is so arranged that the drop or drops of fluid are projected on to the root of the epiglottis, and thence they spread on to the surfaces of both vocal cords. This syringe was made for me by Whicker and Blaise, of St. James's Street; the metal mounting is of gold, but other substances will answer as well, if corrosives are not employed.

When it is desired to inject but a certain quantity,

the syringe is filled with fluid, and evacuated to the quantity required, as gauged by the figure on the glass tube. The handle has simply to be driven home with expertness, and the fluid is sharply ejected upon the desired spot. This mode of application is equally efficacious in aphonia from *chorditis vocalis* in quickly restoring the voice, and many examples of its value could be adduced.

The laryngeal injector, or hand atomizer.—When it is desirable to apply a shower of fluid or spray to the larynx alone, without inhaling it, and in a given quantity, this can be effected by the instrument here represented (Fig. 22).* This instrument is

FIG. 22.



The Laryngeal Injector.

one of the most important in a practical point of

* This is figured in 'Weiss' Illustrated Catalogue,' under the name of "Gibb's Laryngeal Syringe," and it is there stated that "The bulbous point of this syringe is made of platinum, and pierced with exceedingly fine holes." The author has received credit for this invention, both in this and other countries, by persons fully qualified to appreciate its merits.

view that has ever been invented for the treatment of laryngeal diseases, and, although small, is a powerful agent for good in proper hands.

It consists of a thickly ribbed india-rubber ball, and a curved silver tube, without any rings, differing in shape, form, and diameter, from any other tube, especially near its terminal end, where it has attached to it a small circular disc, surrounded by a screw. To this disc a capsular bulb of platinum is screwed on, and so finely perforated that the openings, some forty or more in number, are invisible to the naked eye, yet when the fluid used is projected through them the rays of spray (so to speak) resemble spiders' webs from their extreme fineness. These perforations required a metal much harder than silver to receive the very fine drill employed to make them, and platinum was selected as being the most suitable for the purpose.

When the instrument is to be used, the india-rubber ball is forcibly squeezed between the finger and thumb to expel the air, the bulb of the tube is inserted into the fluid, and is allowed to fill itself during expansion; an extra slight squeeze or two upon the india-rubber ball before taking out the platinum bulb from the fluid will expel any portion of air that might remain. When all is prepared, with the laryngeal mirror introduced into the fauces

with the left hand, the india-rubber ball is gently seized between the finger and thumb of the right, the tube is inserted into the mouth, and the platinum bulb held over the aperture of the larynx. A smart and sharp squeeze is now given, and the drop or two of the fluid is projected within every part of the larynx, and even into the trachea when it is desired to do so, and the tube is withdrawn. The platinum capsule is now unscrewed and dropped into a wine-glass of water to prevent any mucus upon it from drying and clogging the minute apertures; the end of the tube is then held over the bottle of solution, and the india-rubber ball is emptied of its contents. With the same wine-glass of water containing the capsule, the syringe is rinsed out several times and then laid down until the patient has been prescribed for and left the room. Then the platinum capsule is taken out of the glass, the india-rubber ball filled with clean water, the capsule screwed on, and the ball emptied through the minute openings. By this simple precaution and a little care, one of these beautiful instruments will last for years without getting out of order. A plentiful use of clean water is the chief point to attend to.

The special advantages here obtained are the application of nitrate of silver in suitable or limited quantities; there is no taste of it in the mouth, no

enough nor spasm is produced by its application, the fluid is sent to the larynx or trachea only as desired, and a comfortable warmth is experienced by the patient. According to the sharp squeeze given will the quantity be one, two, or more drops; beyond that quantity it is not desirable to go. This mode of applying solutions of nitrate of silver to the larynx is by far preferable to the use of any inhaler, which allows of a certain quantity to get into the mouth, with its unpleasant consequences, always very disagreeable.* It can be projected, when desired, throughout the entire length of the trachea. The tube can be obtained of gold or platinum as well as of silver, but the platinum capsule is always necessary. It has been justly characterised as a *beautiful* instrument for applying *silver showers* to the larynx. In cases of complete pendency of the epiglottis, where it is almost impossible to introduce any agent within the larynx, the bulb may be guided under the cartilage into the larynx, and the fluid spray projected with certain effect upon its walls. *No other known instrument will effect this under the like circumstances.*

In using any solution, care should be taken to see that it is free from any sediment, to avoid stoppage

* I do not use nor recommend the inhalation of solutions of nitrate of silver.

of any of the minute openings ; when such does happen, a little warm water will be serviceable to clear them, together with rubbing the finger and thumb round the capsule.

A large number of examples could be given to illustrate the advantage of this instrument ; a couple, however, shall suffice.

Aphonia, amounting to dumbness, for several months, from chronic inflammation and ulceration of the larynx, the patient obliged to write his ideas on a slate ; restoration of the natural voice in twenty minutes from a single shower of a solution of nitrate of silver.

CASE 5.—Mr. A. G. S—, of Maldou, æt. 34, consulted me May 18th, 1864 (accompanied by his wife), recommended by Mr. Tweed, of Little Baddow. He was perfectly dumb, and had a slate hanging in front of his chest to express his ideas, as he could not articulate the feeblest whisper. His written account of himself was that he had suffered from weakness of the chest and voice, and that he lost the latter six months ago. He could utter a low whisper up to a few weeks ago, but since then he had been absolutely dumb. He expectorated much phlegm in the mornings some weeks ago, and used to feel as if he should choke from its “fixtured in the throat.” There were many other symptoms complained of, one being that he was not able to eat dry bread the last three weeks.

The laryngoscope revealed chronic inflammation of the vocal cords, larynx, and trachea, with extreme relaxation of the mucous membrane, some thickening, and ulceration on the left regulator of the glottis. The external half of both vocal cords was of a deep red, whilst the internal half possessed a streaked redness. There was a small ulcer between the arytenoid cartilages. The fauces

were raw, granular, streaked with vessels, ulcerated, relaxed, and the membrane thickened. With my laryngeal injector I sprinkled the larynx with a shower of a solution of nitrate of silver (a drachm to the ounce), which was unattended by any cough or spasm. In about twenty minutes after the shower he spoke in a clear natural voice, to the astonishment of his wife, who declared his voice was better than she had heard for a long time. Under suitable treatment all abnormal conditions were removed, and his throat and larynx were restored to a state of health in the course of a few weeks.

Acantaphonia; inability to sing the bass notes, from follicular disease of the throat and chronic tracheitis; cure by four applications with the laryngeal injector.

CASE 6.—Mr. J. W. L—, æt. 69, from the County of Worcester, consulted me 31st December, 1862. He had suffered from sore throat, on and off, for some years, with a cough at night, which was most persistent; it seemed to come from the throat, and required him to sit up in bed a long time before it ceased. He possessed a fine bass voice, and used to sing (especially at church), until it was invariably followed by cough, and he had to give it up. Sometimes he was very hoarse; his general health was good otherwise, and he took five or six glasses of port wine daily at dinner.

The laryngoscope showed the mucous membrane of the fauces relaxed, and the follicles enlarged; the larynx was congested, the membrane covering the vocal cords relaxed, and the trachea of a deep red colour, as if from chronic inflammation. Tension of the vocal cords in phonation was feeble. With my laryngeal injector a shower of nitrate of silver was applied on four occasions, which removed the morbid conditions, and a complete cure was brought about, aided by mild constitutional measures. The cough and other symptoms disappeared, and he was enabled to sing in a fine and deep bass voice in church without any discomfort.

Fluid Atomizers for the Inhalation of Fluids reduced to the form of Spray.

The variety of instruments now in use for inhaling fluids containing different substances in solution affords the practitioner an easy choice. Some of them, however, are so complicated, so difficult to keep in order, so ready to become impaired or injured, and so costly—although, as inventions, they possess the highest degree of merit and ingenuity—that it is unnecessary to dwell at length upon them.

Dr. Sales-Giron, whose name is worthy of most honorable mention as the introducer of this mode of treatment, was the first to construct his "Pulverisateur des liquides médicamenteux," an instrument well known, but now superseded by others.

Bergson adopted the plan of atomization by placing two glass tubes, with capillary openings at one end, at right angles to each other; the other end of one tube was placed in the medicated fluid in a bottle filled with it, whilst that of the second tube was fastened by another of caoutchouc two or three feet long, in the centre of which was an air-reservoir, and at the terminal end a species of bellows. When the bellows was squeezed by the right hand the air was pumped up into the compressed reservoir, and,

escaping through the fine horizontal opening, caused a vacuum in the perpendicular tube immersed in the fluid, and sucked up the latter, which was blown into a fine mist or spray.

FIG. 23.



Clarke's Hand-ball Spray Producer.

This apparatus, modified, is now known as Clarke's hand-ball spray producer, and is the simplest as well as the cheapest instrument for general use (represented in Fig. 23). To obtain a continuous stream of spray, the hand-ball must be fully compressed with the hand in rapid succession, say every second, so that the other ball will keep distended and the action unceasing. The bottle should be held about twelve inches from the mouth. In cleaning the glass tube, if obstructed, pins or needles must be avoided; a wet brush dabbed over the points will be useful, and using suction with the larger end. A little warm water will dissolve any crystalline substance and clear the tube.

Dr. Sigel substituted steam for the bellows power, generated by means of a spirit lamp, over which was placed a boiler containing water, into which a metal Bergson tube descends and carries off the steam, which on escaping exerts its effect upon the capillary opening of the perpendicular tube, and blows the fluid forwards in the form of fine spray. A modification of this apparatus by Krohne and Sesemann (241, Whitechapel Road) is shown in Fig. 24, wherein the Bergson tube is of glass instead of metal, a very great improvement, and it is provided with a water gauge (a suggestion of Dr. Andrew Clarke) and a safety valve, whence the steam can escape if

the pressure becomes too high. It is placed upon a brass stand, which at the same time supports a Beigel's screen, thus permitting of the reduction of

FIG. 24.

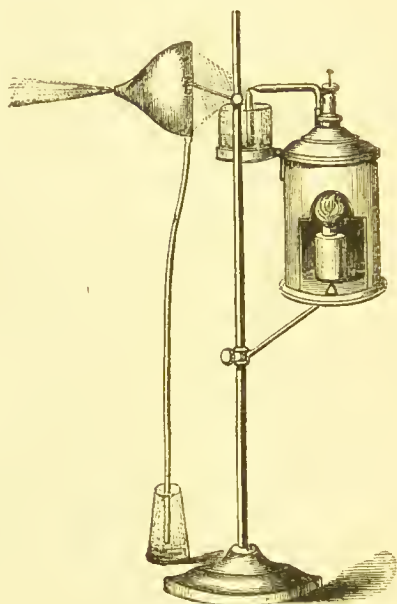


Siegel's Atomizer on a Stand, with Beigel's Screen.

the volume of spray to a diameter that enters the mouth without wetting the face or the dress.

A cheaper instrument was constructed by the same makers for Dr. Beigel, as in Fig. 25, of Siegel's apparatus upon an iron stand, with Beigel's screen, and sold for a guinea, or twelve shillings and sixpence

FIG. 25.



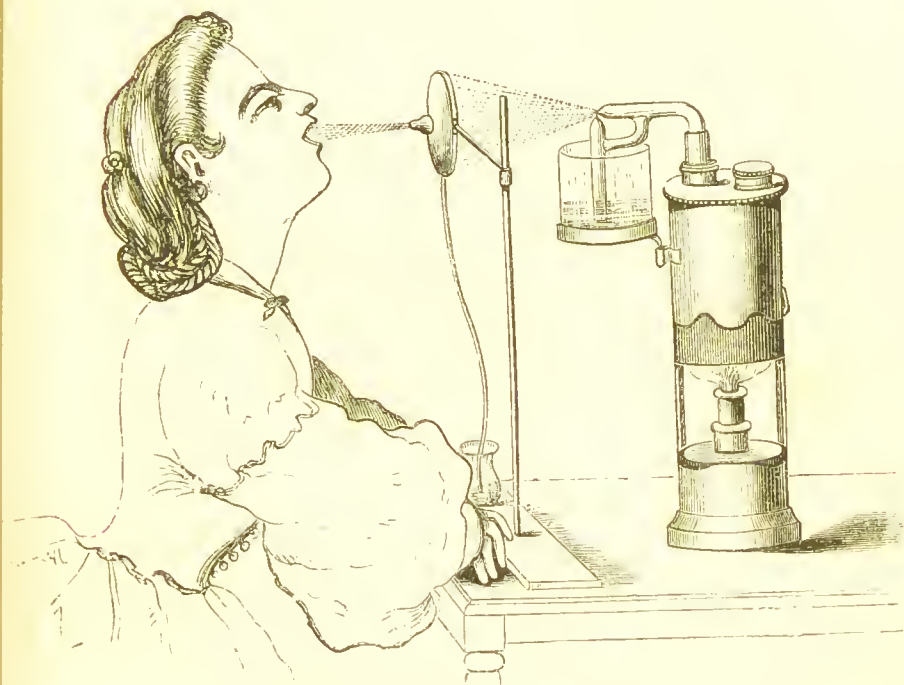
Siegel's Atomizer, of simpler construction.

without the screen. The principle of its use is the same as in the other. Both, perhaps, were inconvenient to carry about, and that was remedied by the "Traveller's Atomizer" (Fig. 26), made for Dr.

Beigel, the whole apparatus being sufficiently small to carry in the pocket, and contained in a case seven inches long.*

The atomizer of Lewin, of Berlin, is well known,

FIG. 26.



Beigel-Siegel's Traveller's Atomizer.

and is upon the principle of compressed air driving the fluid through a jet, which strikes upon a metal

* The reader is referred to Dr. Beigel's excellent work 'On Inhalation' for much information upon all that pertains to the subject of atomizers, published in 1866.

button, producing a fine spray which is conducted along a glass eylinder. With an extensive trial of it and many others, I prefer those having simplicity in their use, and the easiest kept in order. Moreover, those that are portable and can be carried about to the bed-side, and used without the patient being obliged even to sit up, are the most desirable. Self-treatment can be adopted by means of these instruments, a great desideratum sometimes. Many of the substances mentioned in the beginning of this chapter are suitable for use in a properly diluted form, but, as a rule, nitrate of silver, or other caustic substances, should be wholly eschewed for inhalation, an opinion in which I find myself endorsed by Maekenzie. To the practised hand, the reasons for this are so obvious that they need not be entered into.

I shall give a single and brief case to show the value of this mode of applying an agent.

Acantaphonia from mild congestion and relaxation of the mucous membrane of the vocal cords and regulators of the glottis; speedy cure by the inhalation of atomized fluid.

CASE 7.—Madlle. L—, æt. about 30, one of the most accomplished vocalists at the Italian Opera, I saw in June, 1866, in consultation with my friend Mr. de Merie, for slight hoarseness, which incapacitated her from singing. In the laryngoscope was seen the mildest form of congestion and relaxation of the mucous membrane covering

the vocal cords and regulators of the glottis, which interfered with the power of perfect control over the tension of the cords, especially in the higher notes of a magnificent soprano voice. The treatment adopted was the inhalation, for a few minutes at a time, of the spray or atomized fluid of a mild solution of sulphate of zinc, with Dr. Andrew Clarke's little atomizer, and in two or three days the singing voice had recovered all its natural compass and brilliancy.

This lady possessed her own laryngeal mirrors, and was an adept in submitting to their use under the tutorship of Professor Traube, of Vienna.

Inhalation of gases.—The employment of some of the gases and vapours is required in particular instances; they exert a specially favorable influence upon the larynx, the trachea, and larger bronchi, when their indication is clear and their inhalation carefully made use of. The vapours of iodine, bromine, ammonia, oxygen, and chlorine, may be mentioned.

Of iodine.—For inhalation heat should never be employed; the natural vapour, as it arises from the substance itself, is sufficient to obtain the good effects desired. It is used as follows:—Place in a simple glass box about a couple of drachms of iodine; the top of the box is to be covered with a piece of fine wire gauze, and through this is the vapour *breathed* for three or four minutes only. When done with, the gauze is covered up by the lid of the box.* The

* This is sold by J. Robbins and Co., 372, Oxford Street, close to the Pantheon.

irritating effects of the iodine are not felt, and no cough is produced. Bromine may be used in the same way.

Chlorine.—This is seldom required, and when it is it should be used with the greatest caution. It should be kept in a wide-mouthed glass jar, with the stopper greased, and when used the stopper is removed for an instant or so, one breath is taken, and as quickly is the stopper replaced. A violent spasmodic cough is the result, with the restoration of a lost voice. But it should never be employed unless all other means have failed in certain cases of functional aphonia.

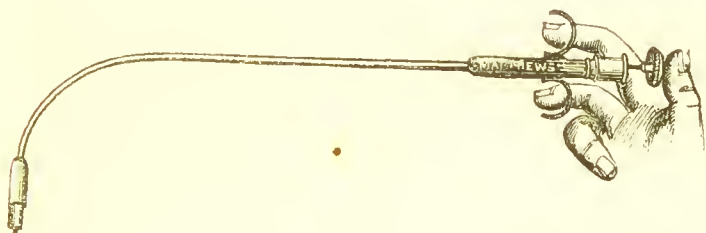
Oxygen.—For this agent a special apparatus is required. Richardson's portable oxygen inhaler I have used and recommended for the purpose. It has been superseded, however, by Dr. Beigel's "Universal Inhaler," for other gases as well as oxygen, and may be applied to the inhalation of volatile fluids and medicated vapours. The inhaler is a beautiful porcelain instrument, sold by Robbins and Co., Oxford Street. They sell the powder also in bottles for the generation of the oxygen, which, when placed in the inhaler, and a certain quantity of boiling water is poured in, immediately frees the gas, and it is instantly ready for use.

Ammonia.—This should be used with the same

precautions as in the case of ehlorine ; it is desirable, however, to keep it (the liquor) in a small-mouthed stoppered bottle, and the vapour may be quickly breathed three or four times without danger, whereas with ehlorine once, or perhaps twice at the most are sufficient.

The application of solid substances to the larynx.—Nitrate of silver in the solid form can be applied to

FIG. 27.



The Solid Caustic-holder for the Larynx.

an ulcer in the larynx by means of curved instruments contrived for the purpose, of which that sold by Mathews, Portugal Street, Lincoln's Inn, is one of the most convenient. It consists of a curved silver tube or canula, containing the nitrate within the end of the curve, which can be protruded on pressing the end of the piston-rod, and, after touching the affected part, is allowed to be withdrawn again into its sheath, as depicted in the woodcut. It is serviceable to destroy growths that cannot

be removed, or to heal up obstinate ulcers within the larynx.

Insufflation of powders.—Various instruments are sold for the introduction of powdered agents within the larynx, of which Rauchfuss's, sold by Krolme, is one of the most convenient. The latter has shown me several ingenious instruments of the kind in vuleanite just received from Vienna, which are employed for the insufflation of alum by singers. Fournie gives a preference to powders for local treatment, and employs an instrument which can be obtained of Charrière in Paris.

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CHAPTER IX.

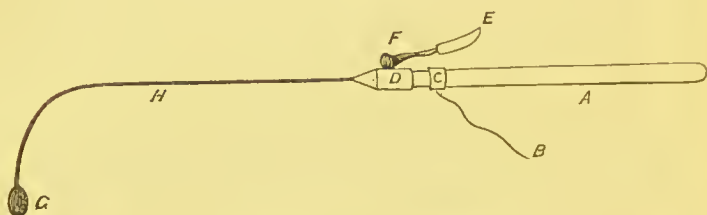
GALVANISM OF THE LARYNX THROUGH THE AID OF THE LARYNGOSCOPE.

THE cure of functional aphonia by means of galvanism was first announced by Lewin, of Berlin, in 1860, and I was the first to apply it in this country directly to the vocal cords, aided by the laryngoscope. I had used it on many occasions by means of the continuous or uninterrupted current, in a stream that could be borne without inconvenience, applied with a copper rod suitably bent, covered with gutta serena. Mackenzie's improvement, however, of interrupting the current by means of an ivory handle, spring, and metallic ring upon a glass handle, thus permitting the regulation of the duration of the electric current, is a decided advantage, and I have adopted it in preference to my own instrument.

The woodcut shows its construction, but I have modified the angle into a curve more suitable for

easy communication with the vocal cords and arytenoid cartilages than is afforded by Mackenzie's.

FIG. 28.



The Laryngeal Galvanizer.

The instrument is held by the glass handle *A*, which is in connection with the electrical machine by the wire *B*, attached to a metal ring *C*. Another ring is present at *D*, which is in connection with *C*, when the ivory handle *E* is pressed upon, through the metal spring *F*, and the current passes to the point *G*, which is covered with sponge. The metallic rod *H* is covered with caoutchouc from *D* to *G*.

Its mode of application is as follows :—The glass handle is held in the right hand like a pen, with the point of the middle finger resting upon the small ivory handle; the curved end of the galvanizer upon which is the sponge is applied to the vocal cords, and the middle finger presses upon the ivory handle, which allows the electric current to pass through the larynx externally to the negative pole on the stem over the thyroid cartilage or other part of the neck wherever it may be held. When applied to the arytenoid cartilages both branches of the pneumogastric nerve are stimulated, and consequently the entire thyro-arytenoid muscles. The student must

remember it is not the vocal cords only that are deficient in nervous power, but those complex portions of the muscles of which they form a part.

The laryngeal mirror should be held in the mouth during the application of the galvanism; but this is not always necessary, nor can it always be done in some patients. Experience will soon afford facility in the use of the galvanizer.

The negative pole may consist of a glass handle with a metal rod covered with caoutchouc, in connection with the wire of the battery, and terminating in a sponge, which may be applied to the neck by an assistant or the patient; or a plate of metal about three inches long, over an inch broad, enclosed in cotton and so bent that it would correspond to the thyroid cartilage when applied; a metal eye projects from the centre of this pad which is in connection with the electrical machine.

In many cases where the voice has been restored by galvanism applied in the manner directed it becomes fleeting and uncertain, from impaired nervous

FIG. 29.



The Galvanic Necklace.

power. This can be obviated by wearing one of

Pulvermacher's necklaces round one half of the neck, which keeps up a mild continuous stream of electricity which is extremely beneficial, and renders the voice permanent.

A few instances will suffice to illustrate the treatment.

Loss of voice for three years, cured by a single application of galvanism to the vocal cords.

CASE 8.—A young lady, æt. 22, was brought to me by her aunt, in August, 1865, for loss of voice, of three years' duration, which followed a slight attack of bronchitis. She was delicate in health, rather nervous, and her voice was reduced to the lowest whisper, so much so that she could with difficulty make herself understood. The last two winters, by the advice of her physician, she spent in Devonshire, but without any benefit. The laryngoscope revealed a healthy but anæmic larynx, with a sluggish action of the vocal cords, and a wide expanded glottis. She was not hysterical, nor was there any disease of her chest. A single application of the galvanizer to the vocal cords was made, and as soon as it was withdrawn from the mouth the voice was restored. It remained permanent, and mild constitutional measures were resorted to for improvement of the general health. On seeing this patient recently, she was in robust health, and her voice had never failed her.

Loss of voice for two years, cured by five applications of galvanism to the vocal cords.

CASE 9.—Miss M. E—, æt. 19, was sent to me by Dr. Wright, of Somerset Street, with loss of voice for two years. It occurred without any assignable cause, but some slight sore throat preceded its disappearance. Her general health was good, yet the whisper was low and scarcely audible. She was not nervous. Galvanism was applied to the vocal cords and arytenoid cartilages at intervals, on

five different occasions. A slight murmur was audible on the third, and it was followed by speech after the fifth. The voice, however, was fleeting and uncertain; a Pulvermacher's necklace was therefore worn for a few weeks, and the voice became permanent and good.

Loss of voice for three years, cured by eleven applications of galvanism to the vocal cords, and the galvanic necklace.

CASE 10.—A young lady was sent to me by Mr. Shorland, of Westbury, in February, 1864, who had suffered from aphonia for three years. She caught a cold; got hoarse; and the voice wholly ceased. She had been under various plans of treatment, including galvanism externally, without any benefit. She was of a nervous disposition, ate scarcely anything, yet was not emaciated, and possessed a mind of great activity and intellectual power. The laryngoscope revealed a healthy larynx, with a sluggish action in the left vocal cord. As she was not a strong girl, she was put upon suitable constitutional treatment; showers of a solution of nitrate of silver were occasionally sprinkled upon the interior of the larynx, and the vocal cords were galvanized on eleven different occasions, when a distinct "hum" became audible, followed by speech on the twelfth application. Owing to the state of her general health, the voice did not continue permanently good, but was at times fleeting and uncertain, until Pulvermacher's galvanic necklace was worn, when it became fairly strong, and has continued so.

Loss of voice for six months, speech restored, after the fourth application of galvanism to the vocal cords.

CASE 11.—Miss C., æt. 24, living at Highbury, was sent to me 28th June, 1864, by Dr. Horace Dobell, of Harley Street. She lost her voice six months before without any known cause, and had lost it on three previous occasions. She was not hysterical; had no cough; and her general health was good. The catamenia were

irregular. The vocal cords were galvanised on four occasions, when the voice returned in the mornings, but disappeared during the day-time. Two further applications restored it, but it did not become permanent until she wore a galvanic chain round the neck for some weeks afterward.

Loss of voice for nearly two years, with impairment of the general health; good speech after the third application of galvanism to the vocal cords.

CASE 12.—Miss B., æt. 33, was sent to me on November 4th, 1865, by Dr. W. F. Lunn, of Hull, for loss of voice, which had baffled all treatment. She looked exceedingly thin and delicate, as if suffering from some internal exhausting disease; and had been so for eight years. With the exception of a short period, the voice had been absent nearly two years, and was now reduced to the most inaudible whisper. The menstrual functions were regular, but there was a tendency to diarrhœa, with griping, and a nervous cough was present, with a little expectoration from the throat. Beyond follicular disease of the throat, nothing was found amiss with the chest or the larynx. She was carefully treated constitutionally, and galvanism applied to the vocal cords on the 6th, 8th, and 10th of November, the necklace being worn from the beginning. On the 10th there was a distinctly audible murmur, and later in the day speech returned in a good natural tone, and ever after continued. Her general health immediately improved; her appetite increased; the griping and diarrhœa ceased; her digestion became good; and she returned to Hull on the 18th November, altogether a new being in the short space of two weeks.

CHAPTER X.

OPERATIONS UPON THE LARYNX THROUGH THE AID OF THE LARYNGOSCOPE.

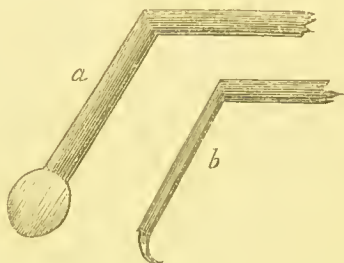
FOR operations, instruments are required for searifying the mucous membrane in œdema of the larynx, opening abscesses, the removal of foreign bodies, extirpation of growths, truncation of the uvula, and allied objects.

Scarificators.—For opening abscesses, puncturing cysts,* or searifying the mucous membrane of the larynx in a state of œdema, acute or chronic, I have contrived instruments the blades of which are here represented: *a* consists of a flat-bladed searificator, with a cutting surface only upon the presenting convex edge, whilst *b* consists of a very small cutting blade, hook-shaped, with the cutting surface on the concave part of the hook. The amount of relief afforded in supra-glottic œdema of

* Mr. Durham, of Guy's Hospital, had a remarkable case of cyst of the epiglottis, which I have quoted in the 2nd edition of my work on the throat.

the larynx by their use is considerable, more especially in acute cases. Blades may be employed of

FIG. 30.



Laryngeal Scarificators.

a, flat-bladed; *b*, hook-shaped.

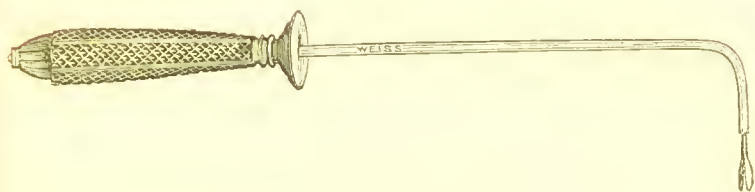
a very small size, a line in length, in the shape of a lancet; but, as a rule, punctures are not so well borne as small incisions.*

Removal of foreign bodies.—Many ingenious instruments have been contrived for this purpose; and when employed to remove a foreign body from the larynx, the point to remember at the time is *not to have* a large curve, nor a long pair of blades, in shape like a lithotomy sound. Such

* For several cases in illustration, see the author's 2nd edition of 'Diseases of the Throat.' The student is here reminded that there is no such thing as œdema of the glottis, for it occurs either above or below the glottis, and hence the names which I have given elsewhere of *supra-glottic œdema of the larynx* (the old œdema of the glottis), and *sub-glottic œdema of the larynx*. See page 202 of the work alluded to.

may do for the throat or the œsophagus, but not for the larynx. Fig. 31 is an illustration of one

FIG. 31.



Laryngeal Forceps.

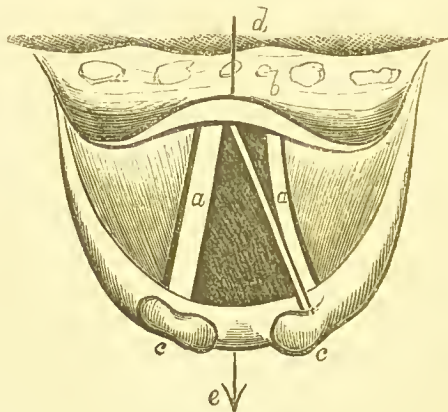
form sold by Weiss, which are introduced with the blades open ready to seize the foreign body. The position of the blades can be turned in any direction desirable, and the eup in front of the handle is pushed forwards, so that the body is grasped in closing the blades upon it. Ferguson of Giltspur Street has contrived a very handy little instrument which will hold a foreign body with great tenacity. Ordinary curved, firmly holding forceps, of slender bulk, I have often found to answer well. And on occasion I have used the loop of wire of my laryngeal excraser, figured further on for the same purpose.

Lodgment of a pin across the larynx transfixing the left arytenoid cartilage, seen with the laryngoscope, and removed by its aid.

CASE 13.—A gentleman, æt. 64, was brought to me in July, 1863, about 5 o'clock in the afternoon. A couple of hours before he drank

a glass of water which contained a pin, and in endeavouring to eject it from the mouth it slipped into the larynx, where it became lodged. The most violent fits of suffocating spasm ensued at first, and recurred every few minutes. Inspection with the laryngoscope was difficult, but with firmness and perseverance it was effected, although the tongue was much swollen. The pin was seen running from before backwards, one end transfixing the left arytenoid cartilage,

FIG. 32.



A Pin lodged in the Larynx.

a. a. The vocal cords, on the outer side of each of which are seen the glottic regulators with commencing swelling. *b.* The epiglottis. *c. c.* The arytenoid cartilages; the left is pierced by the pin seen running from before backwards. *d.* Back of the tongue. *e.* An arrow running through the centre of the larynx, to show the deformity caused by the pin on the left side.

and the other lodged at the root of the epiglottis, between the origin of the two vocal cords. The entire larynx was intensely congested, of a bright scarlet redness, and œdema was about commencing. The vocal cords were purple; the right only acting spasmodically, whilst the left was loose and flaccid, giving an irregular outline to the disposition of the parts, as shown in the drawing. An arrow indicates the median line. With the assistance of

two friends of the patient, who held both him and his tongue, and with the aid of the laryngeal mirror and a pair of reliable forceps made by Luer of Paris, the pin was fortunately seized the first time the instrument was introduced, and extracted. The recovery of the patient was like magic, and nothing untoward happened.

*Transfixion of the base of the tongue by a needle ;
diagnosis and removal with the aid of the laryngoscope.*

CASE 14.—Mrs. Annie D—, æt, 76, was admitted as an out-patient, May 19th, 1866, at Westminster Hospital, under my colleague Mr. Power, under the impression that she had a pin in her throat. He transferred her to me for examination with the laryngoscope. She stated that she resided at Dulwich with her daughter, and that, two weeks before, she swallowed a pin with some pudding. She felt it prick the throat right across, followed by severe pain, particularly on the left side and dysphagia. Every now and then she had a choking sensation, with a disposition to retch. On the 13th (Sunday) she became nearly frantic with suffering, and the next day she retched continuously for nearly an hour. She had lived upon slops since the accident, and could only get them down by sipping small quantities. Her sufferings had been so severe that she had become exceedingly weak and feeble, and she was nearly suffocated on her way to town.

Nothing could be detected externally. The neck was thin, and all the structures were easily distinguished. There was some tenderness across the hyoid bone, especially on the left side, where indeed there was a little tumefaction. In that situation the neck had been much swollen shortly after the foreign body was lodged; but this had subsided to a great extent. The voice was natural.

In the fauces nothing was seen with the unaided eye, but on the tongue being held out, and the laryngeal mirror introduced, the black point of a needle was seen emerging from the base of the tongue on its left side, near the lateral edge of the epiglottis, and

occasionally coming in contact with it to the extent of about two lines. The needle had evidently penetrated the left side of the sac of the pharynx, transfixed the tongue's base in that situation, been driven through its structure, and emerged in the situation described.

Any attempt at removal, without some guiding point, would have been futile. Therefore the patient was made to protrude her tongue out of the mouth with firmness and resolution. The mirror was introduced with my left hand, whilst with my right a pair of curved forceps were inserted, capable of holding the minutest body with unusual tenacity, and I succeeded in getting hold of the point of the needle, and pulled it outwards towards the right side, and brought it out of the mouth. It was perfect, black, and an inch and a half long. All symptoms of discomfort immediately subsided, and the patient left for her home, very grateful for the relief afforded. (See report of the case in the "Hospital Mirror" of the 'Lancet,' July 30th, 1866.

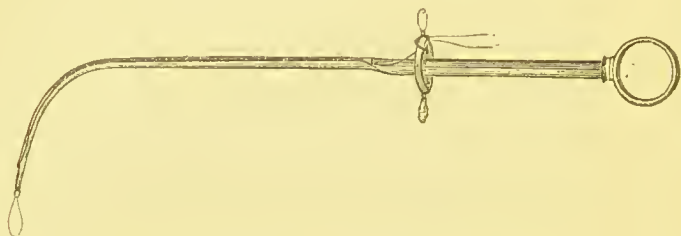
Extirpation of growths.—Growths, whether in the form of polypi or of warts, can be removed in two ways from the larynx, either by means of forceps with small terminal blades which open and shut, or by means of a loop of wire. Fully three fourths of the growths observed can be removed by the latter instrument. Let a wart possess a base of attachment, of a diameter not less than that of its general bulk, and provided the loop of wire can be got round it, its removal is readily accomplished then and there in its entirety. It is by no means essential that a growth should have a distinct peduncle to permit of its removal with a loop of wire. Pecking away at a growth, and removing little fragments

like a bird eating, is neither worthy of the operator, nor serviceable to the patient. The objections brought against the loop of wire by two or three writers are quite preposterous, but they must be overthrown here for the benefit of those who may employ it. I can assure them in all frankness and sincerity, if they remove a warty growth from the larynx by means of a loop of wire, and that it should not actually come away in the wire, their consciences need not sting them if their patient's voice is immediately restored, and the growth seen by themselves and others should be found absent. Such an occurrence, however, is extremely rare; it happened once or possibly twice in my own experience, but as the tumour was cut off, two or three drops of blood flowed, and the voice was then and there restored in the presence of persons who witnessed the operation. I am happy to say that a small growth, even if it did tumble into the trachea, would cause no irritation nor inconvenience, and only a forcible hem or slight cough is necessary to expel it into the sauecr ready to receive it.*

* In a clinical lecture by Dr. Smyly ('Dublin Medical Press'), whose experience was on a par with his opinions, this observation was made on my écraseur: "It is a very useful instrument, but has the great disadvantage, that the polypus, when separated from the larynx, falls into the trachea, and some may be so unkind as to doubt the existence of what they do not see removed." In that

My laryngeal éraseur (fig. 33), an instrument now well known, consists of a small square bar with

FIG. 33.



The Laryngeal Eraseur, with its wire loop.

a ring attached to one end (for the right thumb) and terminating at the other in a curved stem, which is grooved on its upper or convex surface to within half an inch of the point. The latter has two small holes drilled in a line with the groove. A cross-piece slides on the bar, against which the fore and middle fingers rest. A fine steel wire is passed through the holes of the point (so as to make a loop), carried along the groove, passed through the little holes of the cross-piece, and then wound round it two or three times. On introduction, the loop of wire catches the laryngeal tumour like a noose; *it is*

lecturer's hands I have not the least doubt such a circumstance would happen if he were dexterous enough to snare a growth with it. When Dr. Smyly's experience increases, he will avoid writing such nonsense, which is unworthy of any one emanating from the Dublin school.

drawn gently home, the pedicle or base is cut or crushed across, the instrument is withdrawn from the mouth, and the detached growth comes away held with its torn shreds of mucous membrane in the loop.

Its slender form, small bulk, and easy manipulation with a single steel wire, render it superior to any other instrument with which I am acquainted. In all my cases it was applied without any difficulty, as those can testify who were present at my operations.

In using it a single precaution is necessary, and that is, when the growth is snared the wire must not be convulsively or suddenly pulled home and the instrument as quickly withdrawn, else the growth will remain behind in the larynx, but it must be done gently yet firmly; and the mucous membrane, on withdrawal, is torn like that of the outer coat of an artery, and holds the tumour in the loop.

The loop of wire can be maintained in any position desired, according to the situation of the growth; and the curve of the limb of the instrument has been so carefully calculated on the dead, that a growth situated in the anterior subglottic space (below the vocal cords) can be reached with the utmost certainty and celerity.

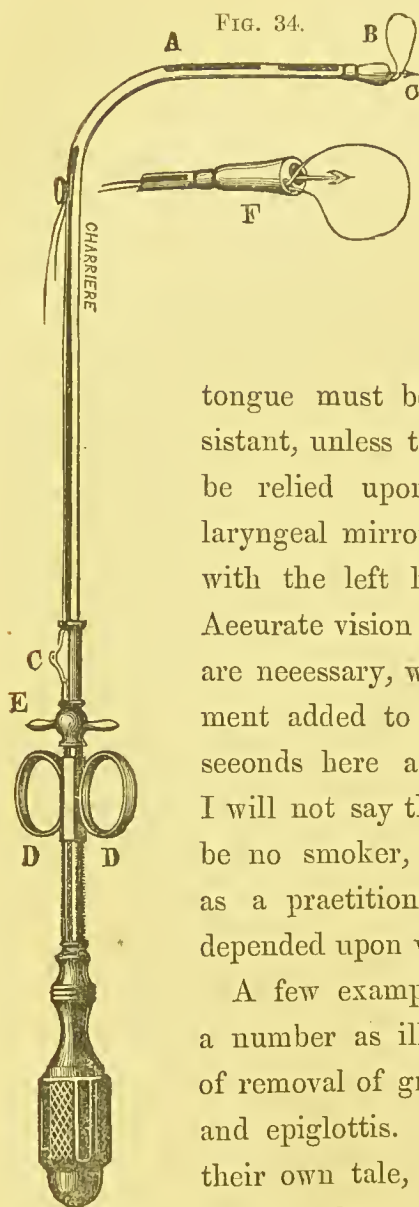
My instrument is not a modification of any other, and most certainly not a modified Gooch's double canula—as has been asserted—for there is nothing of the canula or tube about it.* The curve of the limb is so arranged as to reach any part of the larynx, as illustrated farther on.

The écraseur is applicable to all small growths in

* Dr. Mackenzie speaks of it as follows:—"At a later period, Dr. Gibb, who still further modified this instrument (Gooch's double canula)." Such a statement is distinctly untrue, and must be apparent to Mackenzie, if he ever saw my instrument, which I honestly believe he never examined. He has been at great pains to run it down, and to declare it is not an écraseur at all, because forsooth "the wire loop is not drawn through the eyes of the instrument." He evidently does not know the meaning of the word; the loop, whether in the form of a minute chain or a wire, is intended to crush through the diseased mass, and in my instrument that is effected quickly, necessarily from the *situation* which the disease occupies. It is rather amusing to find the same writer running down the principle of removal of growths by wire loops of any kind, and, notwithstanding, he has actually figured in the second edition of his book on the Laryngoscope, a series of *rigid wire loops*, for jerking or hooking out suddenly portions of growths from the larynx, as one would haul his fishing line out of the water. Verily a more clumsy, unscientific invention, than these ugly, rigid wire loops, was never made, and is only excelled by the monocular instrument already referred to elsewhere. The success of my own instrument must have made itself felt in certain quarters, or it never would have been so vigorously attacked. Of one thing its denouncers may feel assured, my hand is steady enough to apply it successfully, and thus avoid the "pecking away" system, which I maintain in some constitutions is most liable to generate malignant disease, from the irritation it sets up.

the larynx, with the exception of those whose form is such as to allow of no support to the loop of wire. In larger and more disseminated foliaceous or other warts, it will cut off portions without any great obstacle or difficulty, and so diminish their general bulk. When not applicable, the small-bladed forceps sold by Weiss and others will be serviceable in removing growths by tearing away portions at a time. The operator has a number of instruments to select from, not necessary here to describe, such as the forceps and scissors of Von Bruns, and the same of Maekenzie. The *éraseur* of Moura-Bourouillou (Fig. 34) is on the same principle as my own, but the growth is pierced by an arrow at the moment of excision, which is asserted to ensure its withdrawal.

The value of the *éraseur* and its loop of wire in removing growths from the larynx will become apparent to the operator if he will take the trouble to examine the various preparations preserved in the museums of London, a table of which is given in my work on 'Diseases of the Throat' (second edition); and I must again enjoin upon him to remember that it is *not* necessary that a growth should be distinctly pedunculated for removal, but that warty excrescences with a base to hold the loop are as readily snared as if possessing a peduncle, and that the



Moura-Bourouillou's
Laryngeal Ecraseur.

removal of the growth and the cure of his patient must be his first consideration.

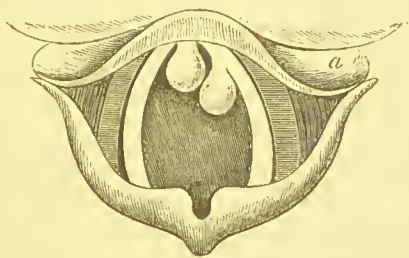
In the removal of growths from the larynx the tongue must be held out by an assistant, unless the patient himself can be relied upon to do it, and the laryngeal mirror must be steadily held with the left hand of the operator. Accurate vision and steadiness of hand are necessary, with precision of movement added to celerity of action, for seconds here are minutes elsewhere. I will not say that an operator should be no smoker, but a moderate one; as a practitioner he is more to be depended upon who eschews the weed.

A few examples are selected from a number as illustrating the manner of removal of growths from the larynx and epiglottis. They sufficiently tell their own tale, but were mostly cured through the agency of the wire loop.

Hoarseness and aphonia for twelve years, from two pedunculated polypoid growths attached to the anterior part of the vocal cords; removal with the laryngeal écraseur by the aid of the laryngoscope, followed by immediate cure.

CASE 15.—A gentleman, æt. 37, was the subject of hoarseness and varying aphonia for twelve years, following an attack of yellow fever in the West Indies. He was profusely salivated for the fever, on recovery from which permanent hoarseness commenced. In the open air he spoke in a low almost inaudible whisper, whilst indoors the voice was stronger, and possessed a rough and hoarse croupy sound. He had been under every variety of treatment for many years without any benefit, as the real nature of his malady was never suspected until he was examined by myself for the first time with the laryngoscope, in November, 1862. Two distinct,

FIG. 35.



Two Pedunculated Growths of the Larynx.

a. Epiglottis, beneath which are the two polypi: the central one arises between the two vocal cords anteriorly, the other from the anterior part of the left vocal cord.

fleshy, pedunculated, polypoid growths were seen attached to the vocal cords nearly as large as peas. One was situated in the central line, springing from between the two vocal cords anteriorly, whilst the other was attached to the anterior free border of the left vocal cord, as seen in the woodcut (Fig. 35). This patient was

shown to some twenty-five different gentlemen, amongst others to Mr. Henry Smith, F.R.C.S., of Wimpole Street on the 5th, all without exception saw the growths with ease and distinctness. On the 6th, I succeeded in removing with my laryngeal écraseur, with the aid of the laryngeal mirror, the growth attached to the left vocal cord; and on the 8th, the other situated in the median line; with the assistance of Mr. George Lawson, F.R.C.S., of Harley Street, and Mr. T. Carr Jackson, F.R.C.S., of Weymouth Street. The voice and hoarseness instantaneously improved, the patient could readily fill his chest with air and felt much more ease in breathing. There was no bleeding. Anæsthesia of the fauces had been produced by the internal use of bromide of ammonium. A little congestion of the larynx followed, but the recovery was most satisfactory, and the voice became strong. Under the microscope, the growths were found to consist of delicate fibres without nuclei in a transparent basement membrane, with multitudes of epithelial cells, many of which were free.

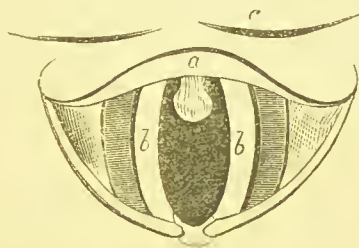
Hoarseness and varying aphonia for ten years, from a fibro-cellular polypus in the anterior part of the larynx, between the vocal cords, removed by the aid of the laryngoscope and followed by an immediate cure.

CASE 16.—A gentleman, æt. 42, was the subject of hoarseness for ten years. He had rubeola at twenty-four years of age, pertussis at thirty, and variola at forty. The voice was reduced to a hoarse whisper, and varied in its loudness of sound; it partook, likewise, of a croupy character. Efforts to speak in a louder tone always produced discomfort and sometimes pain. He had undergone every variety of treatment without the least benefit, and the true nature of his complaint was never suspected. The laryngoscope showed the long existing symptoms to depend upon the presence of a polypus the size of a pea, situated beneath the origin of the vocal cords, and originating in the anterior part of the subglottic space. In phonation, the little tumour would glide upwards be-

tween the cords, and thus prevent approximation. The left aryteno-epiglottidean mucous fold was swollen from œdema, which impaired its action. The growth is accurately represented in the woodcut. It was alternately prominent or retiring, according to the state of relaxation of the throat.

Anæsthesia of the fauces was produced by the internal use of

FIG. 36.



Pedunculated Growth of the Larynx.

a. The epiglottis. *b, b.* The vocal cords, between which is seen the polypus. *c.* Back of the tongue.

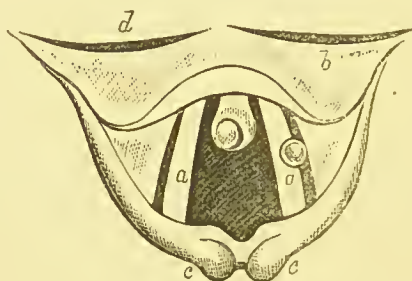
the bromide of ammonium; yet, on attempting to introduce the laryngeal *écraseur*, the reflex action, produced by contact with the epiglottis, frustrated attempts at removal, notwithstanding the celerity of my movements. On the 10th December, 1862, aided by Mr. Alexander Ure, Dr. B. W. Richardson (who admirably gave chloroform), Dr. Logan, and Dr. Fisher, I very readily succeeded in catching the pedicle in the wire noose of the *écraseur* and the tumour was detached. The merest trace of blood was visible.

The result of the operation was most striking, for the voice instantaneously became altered and sonorous, the chest more easily expanded, and the patient felt as if suddenly possessed of increased bodily power and energy. Nothing untoward followed, and a good recovery ensued. In composition, the growth was similar to that removed in the previous instance, consisting almost wholly of epithelial cells, with a very few interlaced fibres.

Hoarseness and aphonia for nineteen years, from a polypus of the larynx, successfully removed by the aid of the laryngoscope; satisfactory cure.

CASE 17.—Captain H—, æt. 47, for many years in China, California, and coasts of the Pacific Ocean, consulted me on 23rd December, 1862, accompanied by Dr. Theobald Smyth, who had been his companion most of the time. For nineteen years he suffered from constant hoarseness, always ending in loss of voice in particular states of the weather, especially when it was damp. His general health was good, but his face was very red. The voice possessed a rough, tre-

FIG. 37.



Polypoid Growth of the Larynx.

a, a. Vocal cords, between which is seen the polypus; a small one is noticed on the left cord. *b.* Epiglottis. *c, c.* Arytenoid cartilages. *d.* Back of the tongue.

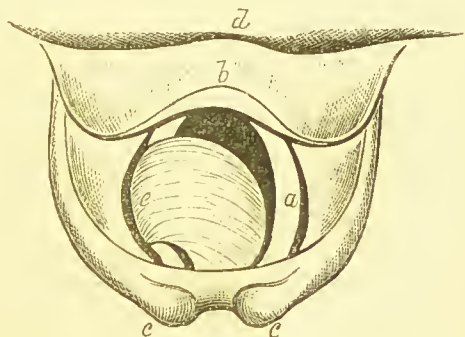
mulous, hoarse sound, which made me suspect a growth beforehand. The laryngoscope revealed a small oval polypus between the vocal cords anteriorly, with a distinct sulcus running across it, as in the sketch (Fig. 37). He was prepared by full doses of bromide of ammonium, and on the 6th January, 1863, with the assistance of Dr. Logan and Dr. Smyth, and in the presence of three other gentlemen, the pedicle was readily caught in the wire noose of the *écraseur* and divided, the growth coming away attached to the instrument. I did not allow him to utter a sound for twelve minutes,

until an astringent solution was applied to the subglottis, for fear of bleeding, although there was none to speak of, and to our astonishment he spoke in a slow, distinct, and pretty loud tone, without any hoarseness. Indeed, it had disappeared as if by magic; and at the period of his departure from England his voice was stronger and better still.

Large cystic polypus springing from the right ventricle of the larynx, causing aphonia for many years, and latterly imminent suffocation; successful removal with the aid of the laryngoscope.

CASE 18.—A woman, æt. 38 years, was sent to me from the country, on account of dyspnœa and stridor, with aphonia, on 2nd May, 1863. She fainted in my passage and appeared to be dying, and was with great difficulty restored to consciousness and strength. She whispered that she had been without a voice for many years, but latterly she was nearly suffocated several times. Fortunately, she

FIG. 38.



Large and flat Cystic Polypus of the Right Ventricle of the Larynx.

a. The left vocal cord. *b.* The epiglottis. *e.* The cystic tumour originating in the ventricle and hanging down the glottis. *d.* Back of the tongue. *c, c.* Arytenoid cartilages.

had a capacious mouth and larynx; in the latter the laryngeal mirror reflected a swelling completely occupying the glottis, and by

degrees it was made out that the left vocal cord was intact, and in some views the free edge of the anterior part of the right vocal cord could be seen; it was evident, therefore, that the growth, whatever it was, sprang either from the right vocal cord or the ventricle of that side. The woodcut shows the position occupied by the growth. The dyspnoea and weakness were such that tracheotomy would have been necessary in a few hours, and time, therefore, was of moment. I sent for my neighbours Mr. Ure and Mr. Teevan; both were out, but I fortunately succeeded in obtaining the aid of Dr. Logan.

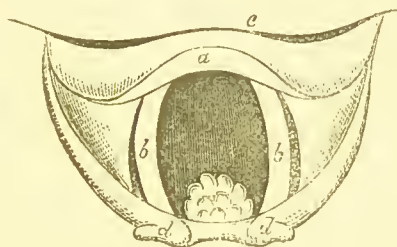
I introduced my *écrasoir* with a large loop of wire turned laterally, and thrice essayed to slip it down the glottis beside the growth. The parts were so benumbed that this caused very little irritation. The fourth time I was more fortunate, and caught the growth about its middle; the wire was pulled home, but would not cut it through, nevertheless it was forcibly withdrawn with the growth, torn from its bed of attachment in the ventricle. A few drops of blood trickled away, and the poor woman spoke in a hoarse but low-toned voice immediately afterwards. She recovered her voice well, and returned to her home at a village near Brighton. No chloroform was given, and yet anaesthesia seemed to exist as the result of threatening asphyxia. The tumour proved to be a cystic growth, developed within a protrusion of the mucous membrane from the ventricle, more or less flat in shape. The only instance resembling it is one preserved in the museum of Gny's Hospital, where a flattened squarish tumour projects from one of the ventricles, but whether it is cystic or otherwise I know not. Meckel says cystic tumours of the larynx are not uncommon, but they are rare in the London museums.

Hoarseness for eighteen months, from a warty growth at the back part of the larynx; removed with the laryngeal écraseur.

CASE 19.—Mr. Henry D—, æt. 51, who had been hoarse for eighteen months, was recommended to me by Dr. Hollis, of Yarmouth.

With the laryngoscope this was found to depend upon a warty growth, with a base of equal size to its diameter, situated at the posterior part of the middle of the larynx, below the arytenoid

FIG. 39.



Warty Growth at the back of the Larynx.

a. The epiglottis. *b, b.* The vocal cords, between which is seen the growth at the back of the larynx. *c.* Back of the tongue. *d, d.* Arytenoid cartilages.

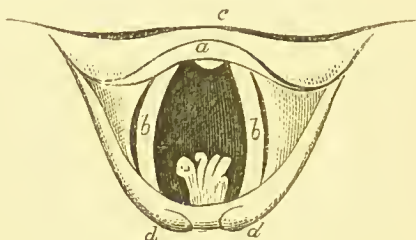
cartilages, as in Fig. 39, and as large as a pea. By topical treatment it shrank a little, but it was mostly removed with the laryngeal éraseur on the 22nd February, 1863, when I had the able assistance of Mr. W. F. Tecvan, of Portman Square. The voice and general health greatly improved, but the tendency to a croupy tone in the former remained for some time afterwards.

Loss of voice for fifteen months, from a warty growth at the back of the larynx, which was successfully removed.

CASE 20.—Miss D—, æt. 25, was placed under my care by Dr. Routh, of Montague Square. She had lost her voice from a cold, in December, 1861, and, although she never recovered it, the whisper at times was rough in its character. The general health was good. In the laryngoscope was seen a fissured warty growth at the posterior part of the larynx, in the same situation as in the preceding instance. Before attempting any curative proceeding, she permitted me to show her larynx to several professional friends. On 29th

March, 1863, Dr. Routh administered a few whiffs of ehloroform with an inhaler of his own contrivance, and sensation was removed from the larynx. I then proceeded to remove the growth with the laryngeal éraseur, and accomplished this with the greatest ease on

FIG. 40.



Warty Growth at the back of the Larynx.

a. The epiglottis. *b, b.* The voeal cords, between which is seen the growth at the baek of the larynx. *c.* Baek of the tongue. *d, d.* Arytenoid eartilages.

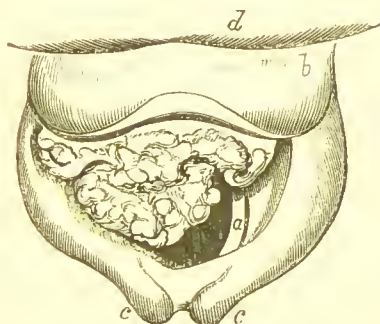
the second introduction of the instrument, and with comparatively little or no bleeding. The voice immediately improved and became strong, but she subsequently lost it two or three times from attacks of cold, to which she was exceedingly liable. She had a strong tuberculous tendency. When last seen her voice was good and melodious, and there was no disposition to recurrence in this nor in any of my other cases here recorded where opportunity was afforded me for seeing the patients.

Hoarseness and varying loss of voice for two years, depending upon a lobular cancerous growth of the larynx, springing from the root of the epiglottis, which was partly removed with the laryngeal éraseur through the mouth and partly through the neck on division of the pomum Adami; death a year afterwards.

CASE 21.—A young maiden lady, æt. 29, was brought to me by

her mother, on 16th March, 1864. She had been affected for two years with varying aphonia, hoarseness, and difficult breathing for two months. She had a mild attack of variola in May, 1863. Efforts at speaking caused pain; every cold flew to the throat; and at night there was cough and a sensation as if she wanted to expectorate phlegm. The right wing of the thyroid cartilage had been swollen, indurated, and painful for five months. The laryngoscope revealed a large, furrowed, irregular, and lobular growth of an ashey grey colour springing from the root of the epiglottis, extending to the right side of the larynx, involving the glottic regulator, and covering the whole of the right, as well as the anterior part of the left vocal cord. This left a comparatively small

FIG. 41.



Cancerous Growth of the Larynx.

a. Left vocal cord. *b.* Epiglottis, beneath which is seen the lobulated and furrowed cancerous growth. *c, c.* Arytenoid cartilages. *d.* Back of the tongue.

space for the passage of air posteriorly, as shown in Fig. 41. No sound could be uttered with the mirror in the mouth. On 29th March the growth was pinker in colour, and evinced a disposition to increase in size. On this occasion I was fortunate enough to succeed in catching in the wire loop of my laryngeal écraseur about one third of the soft projecting portion of the tumour, and quickly cut it through. It was not withdrawn with the wire, as is usually the case with me, but was ejected by slight coughing shortly after-

wards, followed by some bleeding. The relief to the breathing was most decided, so much so as to induce me to try and get away some more of it on April 3rd, but without success, as now the portions left were not sufficiently projecting to catch in the loop of wire. On these occasions I was ably assisted by my friends Mr. Holthouse (my colleague) and Dr. J. B. Blanchet. On April 9th an appointment was made with the family to open the pomum Adami on the 13th, and remove the remainder of the growth, a proceeding which I had previously discussed with the young lady on March 29th. On the 12th, however, she was seized with sudden and most urgent dyspnoea, for which tracheotomy was performed on the same evening by Mr. Holthouse. This afforded immediate relief and general comfort, and was done fourteen days after the removal of the first portion of the growth.

Eight days later, on April 20th, her general health having much improved, chloroform was carefully given by Dr. Holman. The original incision made in the operation for tracheotomy was now extended upwards by Mr. Holthouse, who divided the thyroid cartilage through the pomum Adami with a scalpel and pair of scissors, and the lateral halves were held apart by retractors. Being well acquainted with the seat and position of the growth in the larynx, I myself now introduced my left index finger upwards, and removed the remainder of it partly with my finger-nail and partly with curved scissors, the tumour being soft, friable, and vascular in some parts, and firm in others. The blood poured out, was prevented from reaching the trachea by the vigilance of Dr. Blanchet, and this was much facilitated by the presence of a tube in the trachea. The wound was now closed with a couple of metallic sutures.

Five days after the operation she was sitting up in a chair; on the fourteenth day she was comparatively well, eating heartily and getting stouter. On May 10th the laryngoscope showed the larynx to be free from the presence of any growth; the surface of the mucous membrane was, however, rough. She was walking in her garden on May 19th, and was quite convalescent.

Various portions of the tumour were examined by Dr. Andrew Clark, who discovered in them the elements of epithelial cancer. She went on well for some time, and called upon me in September and October, and had recovered her voice. The disease in the larynx reappeared afterwards and affected the swallowing; it finally quite blocked up the larynx and lower part of the pharynx, so as to almost wholly obliterate the passage in the latter. She died on April 7th, 1865, just twelve months after the operation.

The portions of the tumour removed were exhibited before the Pathological Society, and a paper on the subject is published in the 'British Medical Journal' for 1865, to which the reader is referred for fuller particulars. It was the first attempt in England to remove a growth from the larynx through division of the pomum Adami, and the nature of the case was such that no other mode of treatment than that adopted held out a better prospect of relief.

Large growth springing from the epiglottis, which was successfully removed with the aid of the laryngoscope, by means of an extemporised écraseur.

CASE 22.—Mrs. S. B—, æt. 60, the wife of a clergyman in Lancashire, consulted me on July 5th, 1864. Her son, a medical gentleman, wrote me that she had suffered from her throat affection for two years, had dysphagia for twelve months, with pain and bloody expectoration, and he had discovered a tumour, the size of a small walnut, at the back of the mouth. He suspected stricture of the œsophagus as well. On presenting herself to me she was pale and wan, and emaciated; she spoke in a low, thick, guttural tone, as if the mouth were full of food; indeed, the character of the voice was peculiar in this respect, and clearly pointed to influences wholly above the glottis; dysphagia was complete with fluids, but she could swallow a little farinaceous food, milk and arrowroot, soft bread, or an egg. Frequently the food came through the nostrils. There was no dyspnoea, unless when lying on her back in bed; she coughed and expectorated at night, but not in the day. The laryngo-

scope revealed a roundish, prominent, and projecting tumour, the size of a small walnut, occupying the position of a pendent epiglottis, which, during the act of swallowing, became elevated, and could be seen with the unaided eye at the back of the month, pressing against the pharynx. The epiglottis itself was not seen, nor the interior of the larynx, but the posterior margins of both arytenoid cartilages could be observed. It seemed as if the tumour—partly divided by a sulcus antero-posteriorly—grew from the lingual surface of the epiglottis. The anterior surface and right border of the tumour were red and vascular, in some parts of a whitish colour, and eroded, giving rise to free expectoration of mucus and some oozing of blood.

Seeing the nature of the case, I obtained the advice and assistance of Mr. Alex. Ure, who readily recognised all that has been described, and fully concurred with me on the propriety of removing the tumour. Indeed, there was nothing in the patient's family history, or otherwise, to contra-indicate it; the appearance of the tumour, too, although suspicious, was not malignant, partaking somewhat of a spongy character. Believing that the entire cartilage was involved in the disease, my intention was to remove the whole mass, including all the free portion of the epiglottis, and then to trust to the efforts of nature so to contract the upper laryngeal orifice as to permit of swallowing without inconvenience, as happens in cases where the free portion of the cartilage has been destroyed by ulceration or accident.

On the 7th I proceeded to remove the growth in a dark room, with a moderator lamp placed upon a table towards the left of the patient, who was comfortably seated in a chair higher than the one used by myself; her head was steadied by Mr. Philips, who stood behind her; Dr. Logan was seated at her right side, and held her tongue out, whilst Mr. Ure, standing to my left, was ready with a pair of vulsellum forceps to seize the tumour at the back of the mouth the moment it was detached. My colleague Mr. Holthouse and the lady's husband were also present.

A frontal mirror was used, and worn just above the nose, to per-

mit of a central uninterrupted light and the use of both eyes. Chloroform was not given. The laryngeal mirror was introduced into the mouth, and the growth was readily seen by every one present. The mirror was held with my left hand, and with my right the thick loop of wire and shank of the *écrasoir* was introduced; the loop of wire was passed over the tumour, but an immediate effort at retching occurred, and the tumour at once slipped out. Seeing this, I dispensed with the little mirror, pressed down the tongue at its middle with my left forefinger, passed the loop of wire in a second time, snared the growth at its very base, at once drew the wire home, and detached the tumour; at the same time Mr. Ure passed in the vulsellum forceps and as quickly removed it from the mouth.

The tumour had been removed from the entire lingual surface of the epiglottis as cleanly as if done with a knife; the denuded part was now a bright scarlet, and the margins of the cartilage were well defined. The voice at once became smoother and more agreeable, and lost its guttural character, and she could swallow fluid in small quantities. Without giving the progress from day to day, as the case is fully reported in the forty-eighth volume of the '*Medico-Chirurgical Transactions*,' with drawings, it will suffice to state that she made a most excellent recovery, and regained the power of swallowing and speaking well, and returned home on the 17th. Dr. Andrew Clark kindly examined the tumour, and found it to be benign in its nature, and composed mainly of connective tissue.

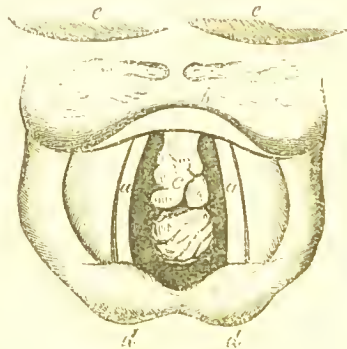
She continued in fair health, and swallowed tolerably well, until April, 1865, when deglutition was attended with coughing and choking, and the voice became weak and throaty. She again came to London, and I discovered a fleshy looking growth, the size of a small walnut, springing from the left half and edge of the lingual surface of the epiglottis. The base of attachment was not large; the right half of the epiglottis had somewhat regained its normal appearance. Its removal was accomplished on the 28th, in the presence of Mr. Ure, Mr. W. F. Teevan, Dr. Althaus, and Mr. J. G. Randall, by the same means and appliances as were adopted on the

first occasion. She now gained health and strength, and left for home on the 9th May. This time Dr. Andrew Clark found the disease to consist mainly of epithelial cancer, which, taken with the recent appearance of a soft tumour in each sterno-mastoid muscle, invested the prognosis with a serious aspect in its ultimate result.

Two large warty growths, one above the other, arising from the anterior part of the larynx, between and below the origin of the vocal cords, producing loss of voice for six years; removal by two operations with the laryngeal écraseur, followed by instantaneous speech on withdrawing the second growth.

CASE 23.—A single lady, æt. 38 years, residing at Sheffield, consulted me for loss of voice, consequent upon a bad throat for six years. The complaint commenced with hoarseness, and during the first three years she coughed up pieces of "flesh," one of which was an inch long, and the shape of a shrimp. For the greater part of

FIG. 42.



Two large Warty Growths of the Larynx.

a. Vocal cords. *b.* Epiglottis, beneath which are the growths. *c,* in the subglottic space. *d, d.* Arytenoid cartilages. *e, e.* Back of tongue.

the time she could not lie down at night, from dyspnœa, supposed

to depend upon disease of the heart; and her complexion was of a deep red. She stated, however, that she had had disease of the heart and rheumatism when young. On examination with the laryngoscope, in April, 1865, a long, fleshy, somewhat bulbous growth was seen to occupy the greater part of the subglottic space, springing from the anterior part of the larynx, below the origin of the vocal cords, and quite immovable. The larynx, in other respects, was comparatively healthy, but there was much irritability and spasm about its proper muscles. The woodcut (Fig. 42) represents the appearances in the laryngeal mirror. The vocal cords, although congested, became of their normal white colour during the examination; and the congestion, when passively present, seemed more the result of difficult circulation through the larynx than from any other cause. After some six weeks' preparation, on the 27th of May, with the assistance of Dr. Logan, who held the patient's tongue out of the mouth, I succeeded in snaring, with the aid of the laryngoscope, a growth in the loop of wire of my laryngeal *écraseur*, cut its thick pedicle, and withdrew it, firmly held by a piece of uncut mucous membrane in the retracted loop. I now discovered a second and much larger growth, which had formed the bed of that already removed, and this was snared on June 1st in a similar manner to the first, with the aid of Dr. Logan, who again held out the tongue, the tumour being likewise withdrawn in the retracted wire-loop of the *écraseur*. The voice was *immediately*—then and there—restored, for the mechanical obstruction to the closure of the glottis, and the consequent inability of vibration of the vocal cords, were got rid of. On each occasion about two drops of blood were expectorated. In a few days the little wound cicatrized, no obstruction was visible, the trachea was seen to be quite normal, and the patient left for her home, quite cured.

Dr. Sieveking kindly examined the little tumours, and found them composed wholly of epithelial cells; to the naked eye they resembled a congeries of small cysts; they were of the size of thick round beans. They were exhibited, with the wire-loops attached, before the Pathological Society, on the 17th of October, 1865.

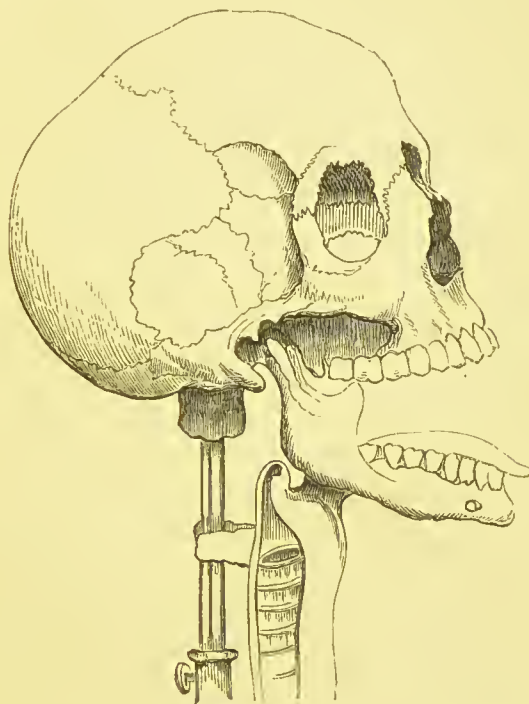
CHAPTER XI.

USEFUL HINTS AND GENERAL REMARKS CONCERNING THE LARYNGOSCOPE.

MUCH has already been stated in Chapter III concerning the use of the laryngoscope, and the hints there given should not be overlooked. In acquiring the art of laryngoscopy, the student has four modes open to him to effect it—one, by examining the friends and members of his household ; a second, by experimenting in hospital practice upon various patients not necessarily affected with disease of the larynx ; a third, by inspecting his own larynx ; and a fourth, by studying the relative regional anatomy of a prepared larynx and tongue fitted to the base of a skull with the lower jaw open. This last is especially suitable to the practitioner whose active labours may preclude him from studying these parts in the dissecting-room. It is desirable, however, to possess a tongue and larynx with the upper part of the œsophagus attached, which can be arranged upon a few books on a common table. For the

teacher of anatomy, the skull may be supported upon a perpendicular movable iron rod surmounted with a cork-like pad to fit into the foramen magnum,

FIG. 43.



Tongue and Larynx attached to a Skull and Lower Jaw.

as in the annexed drawing, in which a sectional view of the larynx is given. For ordinary use the tongue and larynx can be kept in spirit; but if it be sometimes desired to see a perfectly fresh and healthy surface, the head and larynx of a sheep will afford the means of readily accomplishing it.

Facility in the use of the laryngoscope may be readily obtained if the instrument in its social aspect is kept in mind. No better method can be adopted than the examination of a number of healthy persons as opportunity permits, and this may be carried out almost to an unlimited extent until a thorough acquaintance with manipulation, so necessary for the examination of the larynx in a state of disease, be obtained. If a party, say of twenty healthy and intelligent persons—medical pupils, for instance—be submitted to inspection, there ought to be no difficulty in seeing the interior of the larynx in all, with an autolaryngoscopic demonstration into the bargain, in twenty minutes; unless some cause beyond control be present, such as pendency of the epiglottis, seen in one out of every eleven healthy persons. The mere rapidity of examination simply proves how readily the mirror can be applied for inspecting a given number of healthy persons; indeed, I have examined fifty ladies and gentlemen within an hour. Examining parties of from three persons upwards is so useful for acquiring a complete control over the laryngeal mirror that the student is strongly recommended to practise it. Seeing the conformation, colour, and peculiarities of position of the parts in a state of health in a given number of healthy people will do more to impart a sound

knowledge of the larynx than the inspection of the same parts in disease. Next to this, if there be no intolerance to the introduction of the mirror, self-examination should be persistently practised.

Let the laryngeal mirror be considered as a social instrument, and it can be employed in the family circle amongst young and old. An explanation beforehand of what it reveals will, amongst the young especially, create a desire to know how their own vocal cords look ; and this feeling is so contagious that even young children will surround the manipulator's chair with a very urgent request that they be not passed over. A good preliminary to this is an autolaryngoscopy demonstration, with some phonetic illustration, such as the air of a song. Any one who can learn to do all this will have no difficulty in examining cases of disease and acquiring the art of laryngoscopy.

In these healthy recreations (shall they be called?) some very curious peculiarities often come to light, and a shrewd person will be able to form an opinion in his own mind as to the capacity for singing and speaking possessed by certain individuals.

In examining the throat, the larynx, or the nose, all the various special parts and structures to be found in these situations must be remembered (see Chapter V), together with their shape, position,

colour, and movements in health. In regard to the movements of the vocal apparatus in the production of sounds, this is most essential.

In the application of remedies to the larynx, experience is daily confirming my opinion of the simplicity of the treatment and the comparatively few agents necessary to accomplish it. A common lamp, a reflector, two or three mirrors, with a few curved brushes, are all that the practitioner requires, with, perhaps, the addition of Mackenzie's galvanizer. Before the laryngoscope was employed I treated with success the majority of cases that came under my care with the brush alone, and its value has not diminished since the laryngeal mirror has thrown light upon the subject.

In conclusion, I would enjoin upon the reader not to fall into the error of "over-treating" the diseases of the larynx; moderation in this respect he will find an advantage, and will discover that the structures in the interior are not a whit less sensitive or less delicate than are those of the eye.

CHAPTER XII.

RHINOSCOPY.

History.—Rhinoscopy is the art of examining the posterior recesses of the nostrils and of the pharyngo-nasal cavity; it is a more difficult proceeding than laryngoscopy, and requires patience and perseverance to effect it in some persons. It was practised by Bozzini in 1807, next by Beaumes in 1838, and thirdly by Avery in 1846. The idea of inspecting the Eustachian tubes was conceived by Wilde, of Dublin. The perfection of the art was worked out by Czermak, who contrived various useful instruments for practising it, and who has given many observations and some cases in his work translated by the author for the New Sydenham Society. Many others have written upon the subject, but the most valuable work which has yet appeared is by Semeleder, who has established himself as our first authority on rhinoscopy.

Description and practice.—The theory of rhinoscopy is the same as that of laryngoscopy; a small

mirror is introduced to the back of the pharynx with its reflecting surface turned upwards ; the throat is illuminated in the usual way by means of a large reflector on the forehead ; the rays of light are received in the small mirror and thence reflected upwards and forwards into the posterior nares, receiving at the same time the image of the parts, as in laryngoscopy. The tongue is kept downwards by means of a depressor or spatula, usually held by the patient himself, but this is not always necessary. Czermak contrived a blunt and flat hook to catch the soft palate about its centre, and to elevate and draw it forwards. In some persons this proceeding is not required, for the space between the soft palate and wall of the pharynx is such that the mirror can be held on either side of the median line, behind or below the velum, without inconvenience, and a good view of the right or left nostril with the Eustachian tube is obtained. This is particularly desirable also when irritability of the fauces prevents the use of the hook. In employing the hook, it should be warmed and introduced with the left hand, and the mirror with the right. The size of the mirror should be about or a little over half an inch in diameter.

In the process of examination the patient is placed in all respects nearly in the same position as for laryngoscopy ; the head may be bent slightly forwards

to allow of the uvula to hang forwards. The tongue is pressed downwards, and the mirror is introduced on either side of the fauces, first obtaining a view of each nostril, and then turning it sideways to see either Eustachian tube. With a little manipulation a ready view is obtained of every visible part of the post-nasal recess. During examination the utterance of nasal sounds is useful, and the breathing must be effected by the mouth, and not the nose. This latter is essential.

In the great majority of cases I have found the palate hook unnecessary, and I would recommend the avoidance of any instrument combining mirror and hook or tongue-spatula together. Either of these last is a clumsy and unscientific instrument.

Rhinoscopic image.—If either nostril is separately examined, the middle turbinated bone is the most prominent object, and beneath it the inferior turbinated bone, seen in its upper half projecting inwards from the outer wall. Sometimes the inferior bone is either not seen at all or a very small portion of it only, or the middle bone seems to be the only object visible in the mirror. The left middle and inferior turbinated bones are well shown in Fig. 46, whilst the middle only is noticed in Fig. 44. The superior turbinated bone is not always to be seen; it is more deeply seated, although the superior meatus

leading to it is the largest of the three meati. Between the nostrils the septum is observed, varying in its symmetry, but generally straight, and always conspicuous, from its almost white appearance, owing to the thinness of the mucous membrane covering it. On the outer margin of each nostril, nearly upon a level with the inferior turbinated bone, but farther backwards, is seen the trumpet-shaped orifice of the Eustachian tube (see Figs. 44 and 46), always recognised by its paler colour than the surrounding membrane, with a tinge of yellow about it. The colour of the membrane upon the turbinated bones is a pale fawn or drab, seldom pink, unless congested. That behind the velum is always pink. The spaces of the three meati are always dark. The floor of the nostrils is seldom to be seen, for the posterior arched surface of the velum conceals the inferior part of the nasal fossæ. A catheter introduced from the front into the Eustachian tube is readily distinguished. In persons with capacious nostrils the nose can be examined with small mirrors from the front, and the nasal orifice of the lachrymal canal can sometimes be seen.

Hints.—The student must be cautious not to confound the turbinated bones with polypi, a mistake which has occurred, and he must remember that their shape varies sometimes, as seen in the rhino-

scopic mirror. When polypi do exist their diagnosis is generally easy, from the glistening and shining appearance which they almost invariably present. For the study of rhinosecopy, cases of fissure of the soft or hard palate, or loss of the former by ulceration, afford a good view of the parts, without any difficulty or inconvenience. And in many persons rhinosecopy is easy enough when the examination is made with gentleness and delicacy, notwithstanding the presence sometimes of troublesome obstacles. On the other hand, there are persons who, from peculiar conformation or from adhesions of the soft palate to the pharynx, the result of disease, can never be examined by rhinosecopy.

Application.—Rhinosecopy is required in cases of polypi of the nose, tumefaction of the mucous membrane from coryza or other causes, ozæna, ulceration of the turbinated bones or the septum, deafness originating in obstruction of the Eustachian tube, and the presence of foreign bodies. With regard to the last, I examined a girl aged 15, brought to me by Dr. Hickman, of Dorset Square, on the 12th October last, who had had a purse ring lodged at the back of the nose for thirteen years, which had been detected and removed by him with the aid of the rhinoscope a few days before. The cause of long years of suffering had never been suspected. The

examination was very easy with a palate hook, and the greater part of the septum, with portions of both middle and inferior turbinated bones, was found destroyed. The most common nasal affection which presents itself for examination is the distressing malady known as ozæna, oftentimes depending upon ulceration of some part of the nasal recesses.

Epistaxis for thirteen years from ulceration of the membrane covering the turbinated bones, as seen with the rhinoscope.

CASE 24.—J. G—, æt. 17, a girl of strumous habit, pale and delicate looking, was admitted under my care, into the West London Hospital, on 8th November, 1862, for epistaxis. She had had pertussis, rubeola, and scarlatina, when four years old; after the last

FIG. 44.



Ulceration of the Inferior Turbinated Bones.

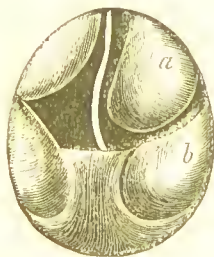
she became subject to bleeding at the nose, which remained persistent, occurring daily from both nostrils, but more so from the left than the right. The catamenia commenced seven months ago.

Rhinoscopy was difficult, on account of some contraction of the velum palati from the scarlatinal angina (no doubt attended with ulceration, as cicatrices were seen here and there), yet it was carried out, and showed very red and vascular ulcers on the posterior surfaces of both inferior turbinated bones, which gave rise to the constant bleeding which had blanched the patient. These ulcers are shown in the woodcut. Topical treatment, such as the application of a solution of nitrate of silver to the ulcers, and attention to the general health, were the chief means relied upon to bring about a cure.

Destruction of the turbinated bones of the right side, with the entire vomer and both nasal bones, the last permitting of a view into the nose through a fistulous opening in front.

CASE 25.—Eliza F—, æt. 36, was admitted under my care at Westminster Hospital in November, 1863, for chronic syphilitic laryngitis. She had been subject to sore throat on and off for ten years; six years ago she lost the nasal bones, and an oval opening formed in the face at the top of the nose, which now permitted of

FIG. 45.

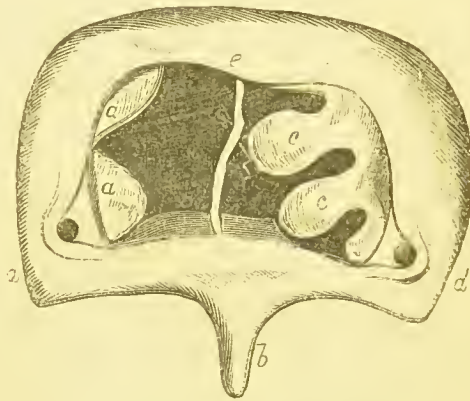


View of the Nostrils from the front.

a. The left middle turbinate bone. *b.* Left inferior turbinate bone. The membrane only of the last bones is seen at the opposite side, and at the posterior part a thin bridle of membrane.

a view within its cavity, as in Fig. 45. This opening is represented of the natural size, and shows loss of the vomer, most of the cartilaginous septum, and the right turbinated bones represented by the remains of the membrane at one time covering them. A small bridle of membrane is seen at the back part of the cavity, running from above downwards. A circular opening was present, the size of a sixpence, in the anterior part of the hard palate, which led upwards into the cavity of the nose. The floor of the nose was seen

FIG. 46.



View of the Nose from behind.

a, a. Membrane of the lost right turbinated bones. *c, c.* The left turbinated bones. *b.* Uvula. *d, d.* Eustachian tubes. *e.* String of membrane.

to be more or less naturally flat, and in swallowing the velum could be seen to rise up at the back of the nostrils. The sense of smell was impaired, but not lost. In addition, she had chronic disease of the larynx, hoarseness, and croupy cough. The rhinoscope gave a view the counterpart of that seen in front, as in Fig. 46, which well displays the extent of the ravages produced by the disease. The middle and lower turbinated bones are seen to be unaffected, and a fine view of them was obtained; whilst the shrivelled-up membrane

was observed on the right side, marking the site of the lost turbinated bones in that situation. This patient much improved under large doses of iodide of potassium; she avoided cold by keeping the openings in the nose and roof of the mouth plugged by pieces of moist lint, and recovered her natural voice. She presents herself from time to time at the hospital, and the old disease seems to have become arrested; the rhinoscopic characters remain the same.

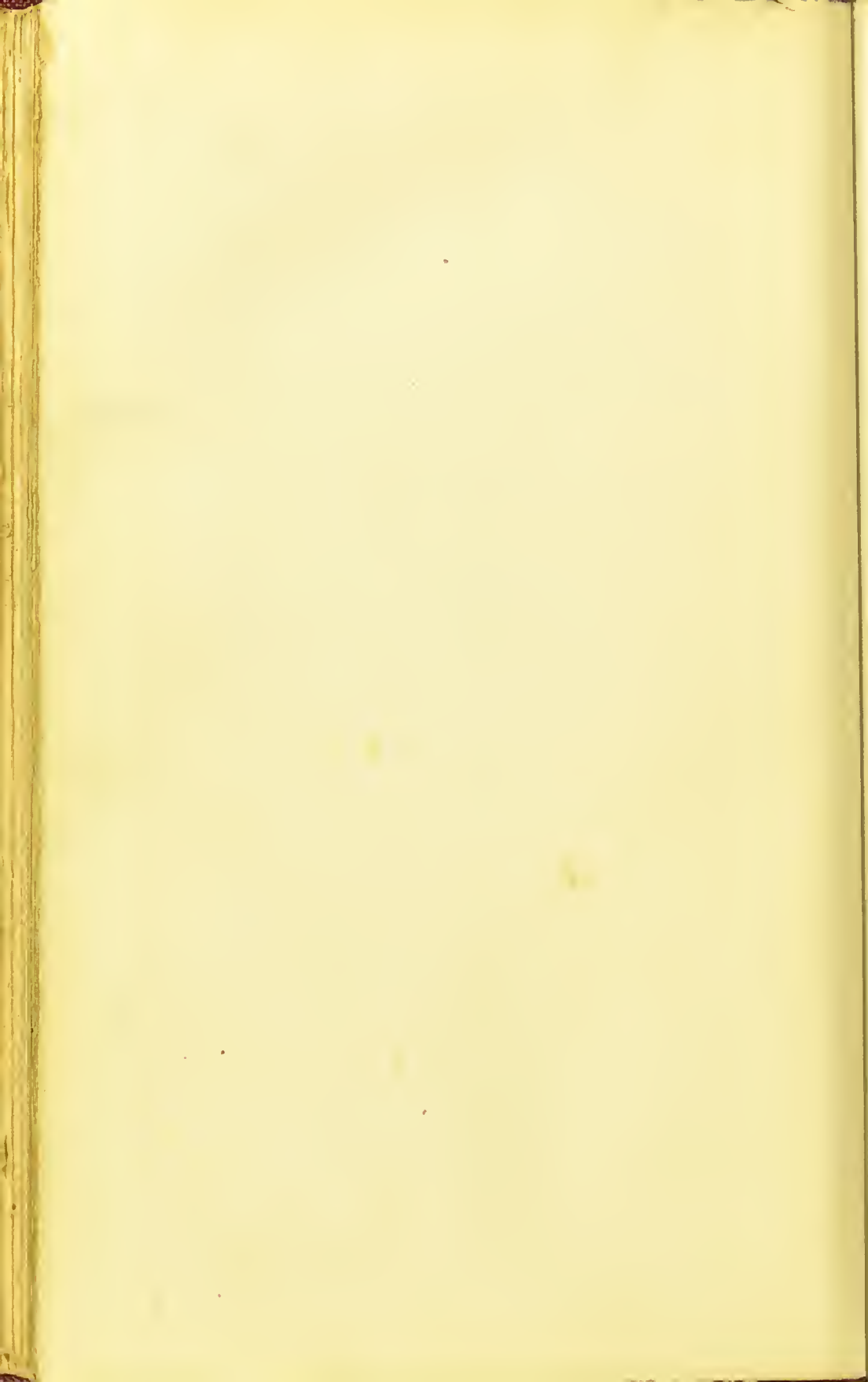
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Semeleder's work already referred to; Czermak, in his work on the 'Laryngoscope;' together with the writings of Stork, Turck, Voltolini, Mackenzie, Walker, Merkel, and Wagner of New York.



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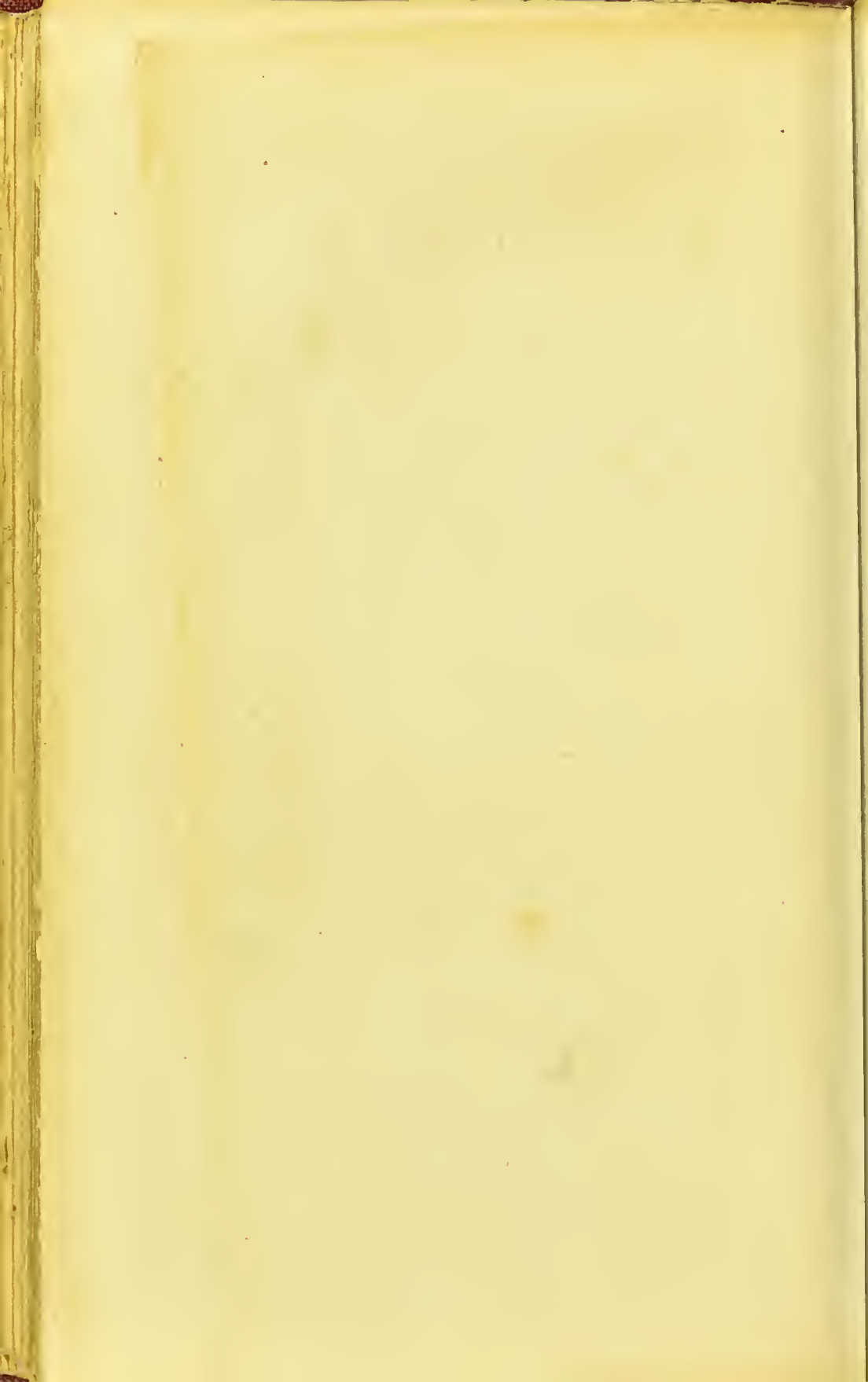
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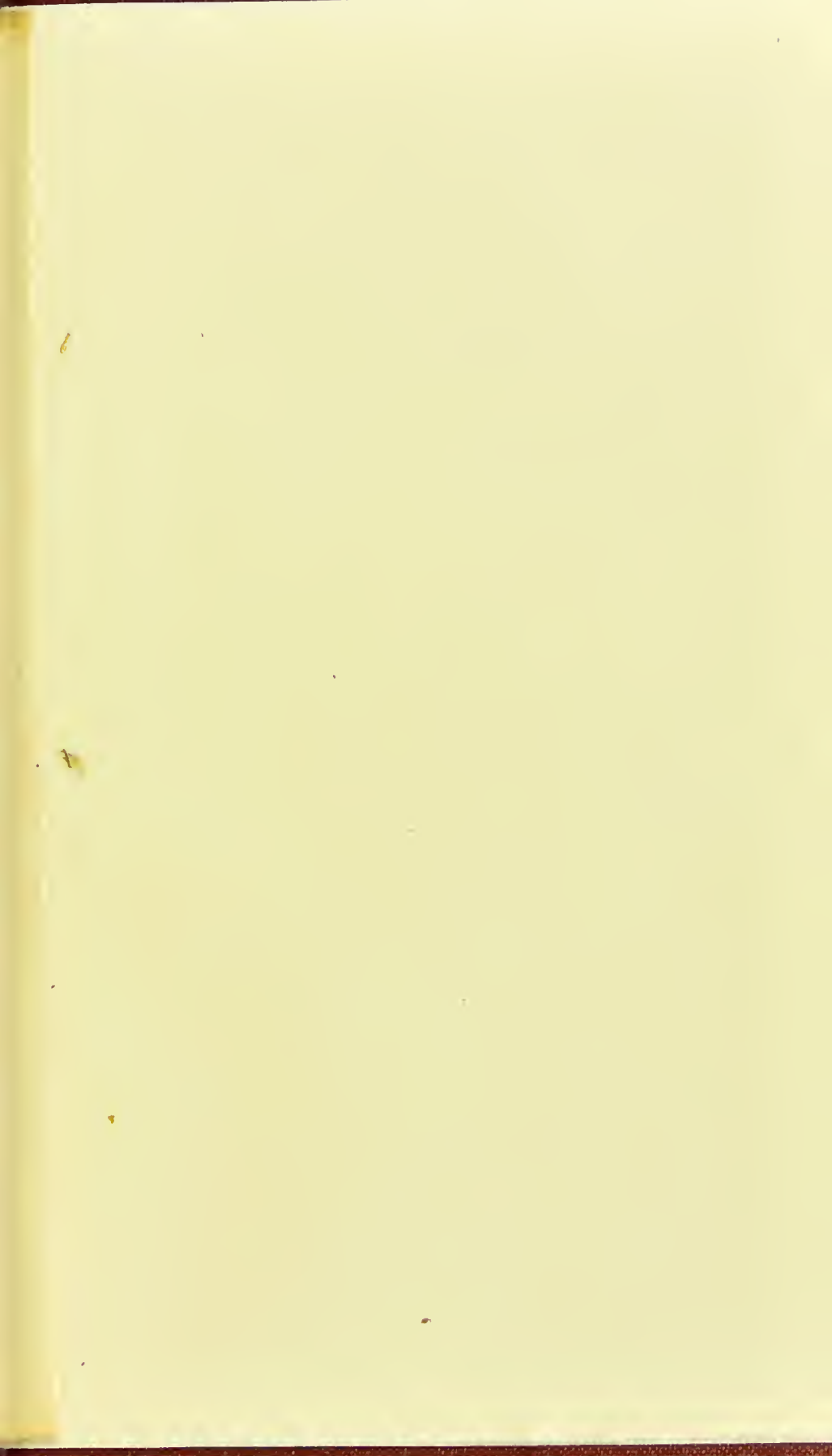
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